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PRURITUS OF  
THE PERINEUM

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JOSEPH F. MONTAGUE



PRURITUS  
OF THE  
PERINEUM



# PRURITUS OF THE PERINEUM

[PRURITUS ANI, VULVAE AND SCROTI]

BY

*C*

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*President of the New York Academy of Medicine*

WITH THIRTY-SEVEN ILLUSTRATIONS



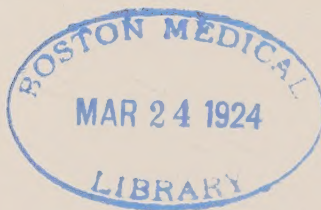
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TO PROFESSOR GEORGE DAVID STEWART  
*in grateful appreciation and sincere  
admiration this monograph  
is respectfully  
dedicated*



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## PREFACE

Nowhere in the practice of medicine may one find an ailment so little understood, so grossly misunderstood and so empirically treated as pruritus of the anus, vulva or scrotum.

In quest of knowledge the physician in general practice turns to the standard textbooks on proctology, dermatology and gynecology. Here will be found a short chapter on the subject usually consisting of vague generalizations carried from one book to another. A thorough search of medical literature reveals no evidence that a *study* of this disorder has hitherto been made.

In this monograph, however, no such compilation of previous and existing opinions is presented. Instead, an analysis of these is made; conclusions as to their merits are drawn and a definite explanatory theory is offered on the basis of data gathered by the author throughout a period of experimentation, observation and research extending over eight years.

The book therefore has for its purpose the complete logical analysis and treatment of a subject which has heretofore been considered a mere incidental topic in the field of rectal and skin diseases.

I take this opportunity to express my gratitude toward those who have graciously aided me in this accomplishment. I am greatly indebted to certain members of the faculty of the University and Bellevue Medical College for their kindly criticism and wish to thank in particular Dr. George David Stewart, Professor of Surgery, on whose service much of my work was done. I am grateful to Prof. William H. Park, Director of Laboratories of the City of New York, for his counsel and criticism in regard to my bacteriological researches and to Prof. Douglas Symmers, Director of Pathological Laboratories, Bellevue and Allied Hospitals for his supervision of the pathological work done. To Prof. H. D. Senior, I am indebted for advice on anatomical matters

while to Prof. H. C. Jackson I owe much for his constructive argumentation on the physiological aspect of this subject. The generous and constant assistance of my publishers, Paul B. Hoeber, Inc., and their editorial staff, has been of incalculable value in the preparation of my manuscript.

When one experiences cordial cooperation such as I have had from the faculty of the University and Bellevue Medical College the glory of our modern educational system becomes apparent.

*Montague.*

540 PARK AVE., NEW YORK,  
November, 1923.

## FOREWORD



PRURITUS of the perineum is a very distressing disease. The sufferer from this ailment probably gives it too much consideration; the medical profession has never given it enough. By the latter it is usually classed with hysteria (or neurasthenia) and dismissed after a few ointments have been tried.

Dr. Montague's monograph is a methodical, careful survey of the subject from all points of view; physiological, anatomical, pathological, etc. It is particularly gratifying that one who has elected the study of diseases of the rectum as his specialty should assume the task of clearing up such vaguely understood ailments as pruritus ani and vulvae.

This volume, I am sure, will be very helpful not only to specialists, but also to the general practitioner and thus indirectly of particular benefit to the patient.

GEORGE DAVID STEWART, M.D.

New York, N. Y.

*November, 1923.*



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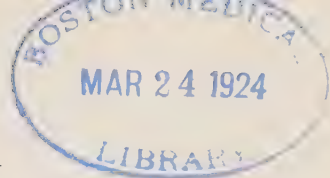
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# PRURITUS OF THE PERINEUM

## CHAPTER I

### GENERAL CONSIDERATIONS

#### HISTORICAL SURVEY

A historical survey to date of the official medical literature on record shows no less than one hundred and fifty seven articles on the subject of pruritus ani. In addition to this there are over four hundred such articles to be found in the quasi-medical magazines, trade journals and pharmaceutical periodicals on the same subject. This is exclusive of the textbooks on rectal diseases most of which have some mention of the condition. Of the above mentioned essays, seventeen are British; eighteen, German; twenty-five, French; seven, Italian; three, Canadian, and one from Chili and Belgium respectively. The remainder are American articles.

As early as 1688 the subject attracted medical comment and assumed the consideration of a distinct entity. Thus in 1694 Josephus Lanzonius writing in the *Miscel. Curiosa. Acad. Nat. Cur. Lipsia*, mentioned and described a terrible form of this itching condition which he called a "pruritus," and thinking he observed a certain periodicity of the disease sought to explain it on the basis of the then current astrological systems as being related to the solstice of the sun.

From that time on the subject was occasionally mentioned in the medical writings of hospitals and it is interesting to note that in 1868 we find Leon Gros writing a lengthy article in the *Bulletin général de thérapie et chirurgie*, on his great success in the treatment of this ailment by means of tobacco smoking.

In reviewing the medical essays on this subject during the last six decades the number appearing, as graphically indicated in Figure 1, shows a remarkable, steady increase from three in the decade 1861 to 1871 to sixty in the decade

1901-1911. The following decade, owing to the incidence and progress of the World War, showed a decrease, as it did in medical articles in general.

The steady increase in medical comment on this subject might draw us to the conclusion that the disease is on the increase. This is undoubtedly true to a certain extent, but in my opinion it is more likely due to better means of news distribution throughout the world, the growing system of national and international medical scientific conventions, more accurate clinical examinations and

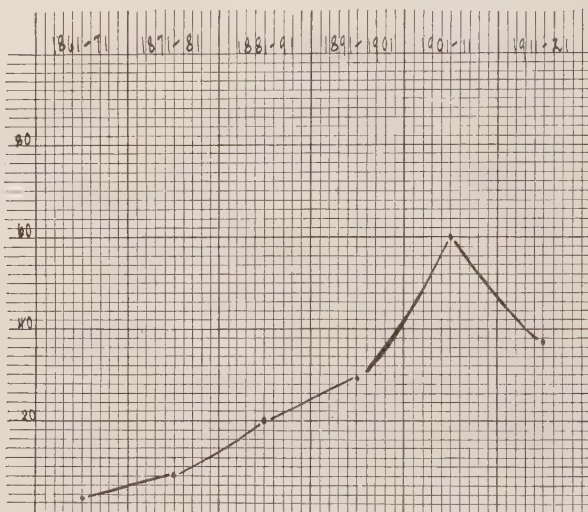


FIG. 1. Graphic representation of articles on pruritus ani contributed to the medical literature from 1861 to 1921. Note the steady and marked increase in medical interest in the subject.

the great increase in public knowledge on matters of health together, possibly, with a decrease in that form of false modesty which inhibits a patient from disclosing this type of ailment. The fact that the condition is not a fatal one, except in those cases forced to self-destruction, renders it liable to be overlooked in the autopsy room.

Although there is no record of the occurrence of the condition having been inscribed on the tablets of the Temple of Hippocrates, yet I am of the opinion that it has existed, nevertheless, from the earliest times. Suffice it to say, that as long as it has been customary to make clinical reports men-

tion has been made of it, and at the present day it constitutes a real problem in the field of proctological therapeutics. The agonizing distress these patients undergo and the impotence of the majority of physicians to relieve them is indeed a reflection on our art.

### SYNONYMOUS TERMS

There are many appellations under which this condition has been described and discussed. According to the region chiefly affected "Pruritus of the Perineum" is designated as "Pruritus Vulvae," "Scroti," or "Ani." The latter term has many colloquial synonyms. Among the laity "Itching Piles" is the favorite name, betraying, as it does, the transmission from the medical profession to the laity of the once prevalent view that hemorrhoids were the cause. The rank and file of the medical profession have always referred to the disease in question as "Pruritus Ani" or as "Anal Pruritus." Substituting for the Latin terms just plain English, "Itching of the Anus" is often used, but to my mind this seems to mitigate the importance of the condition as a clinical entity. "Pruritus Analis" is another term that is used by some. In those instances in which authors have sought to impress the medical public by the sonorous tones of the names when the weight of their ideas might fail, such terms as "Idiopathic Pruritus Ani," "Pruritus Ani Essentialis," "Poikilomorphic Pruritus Analis," and "Cryptogenic Anal Pruritus" have found favor. Needless to say, such terms as the latter insult the intelligence of the reader. They tell nothing, confessing ignorance in their very names. Inasmuch as they fall short of their function as names which is to epitomize designation or description, they should be abolished as needless burdens to medical literature.

### DEFINITION

The clinical condition, known by the medical profession under the various names previously mentioned as synonyms, is a syndrome induced by direct or indirect irritation or diverse forms of trauma along the neural pathway from the pruritic zone, a definite area of the anal canal and the perineal skin, to the cerebrum, and which consists in:

1. *Subjectively*: the perception of an intense, persistent pruritus which causes extreme excitation of the nervous system and much mental distress and in addition gives rise to an almost irresistible desire to scratch.

2. *Objectively*: pathological changes in the pruritic zone in the nature of a chronic productive dermatitis which usually precedes but may follow a chronic infective dermatitis.

3. *Clinically*: a symptomatic vicious cycle wherein the pruritus induces efforts at relief which result in the production of a secondary pathology the effect of which is to increase the pruritus in direct proportion. This cycle is characterized by extreme chronicity, frequent complication by low grade dermal infection and a tendency toward a kraurotic termination.

#### DATA OF INCIDENCE

*Geographical Distribution.* The geographical distribution of this disease is wide, cases having been described and reported in most of the European countries and in both North and South America. Cases have also been reported at Valparaiso, Chili, at Cairo, Egypt, and as far North as Russia. England, France and Germany according to their medical literature regard it as the most frequent disease of the rectum and anus.

*Climatic Characteristics.* It may be said that this disease is by no means seasonal in its occurrence. The majority of observers agree that during the low temperatures and low humidity of winter when the glandular activity of the skin is reduced to a minimum, it has a tendency to become acute or exacerbations are prone to precipitate during such conditions. This is particularly true at the commencement of fall or winter. In general, it may be said that cold weather, particularly dry cold weather, favors the development of this disease. A liberal proportion of these cases, however, occur or persist throughout the summer and, indeed, in obese subjects, owing to incidental intertrigo, may actually make this season seem the worst. It may, therefore, be said that the season of the year seems to exert no very great influence, though it is commonly said to be more marked in cold weather.

**Race.** Race seems to confer no immunity, as negroes are affected in an exactly similar manner, although of course the vast majority of cases observed are in those of the Caucasian race. It attacks equally all classes of society, being found to an equal extent among rich and poor. Various writers have stated that this condition is the result of filthy habits or general lack of ablution, but my experience has been that this has no primary effect upon the causation. At the St. Marks Hospital in London I gathered the opinion that practically all these cases were of remarkably normal habits.

**Sex.** As to the influence that sex has upon the incidence, it is a known fact that both men and women are affected, but concerning the exact ratio there is a variance of opinion. Adler, writing in the *Philadelphia Medical Journal* in 1900 presents an analysis of over 200 cases, of which he found that in 9 out of 10 cases the person affected was a male. On the other hand, Sabouraud of Paris, writing in *La Clinique* of Paris in 1906, declares it to be more frequently found in females and usually associated with vulvar pruritus.

**Age.** The ages most frequently affected are between twenty-five and thirty-five, although the disease is by no means confined to these limits. It shows a tendency to become more frequent again between forty-five and fifty, and in general it may be said that it has been known to appear practically at any age, although chiefly confined to adults and more rarely occurring in children. Some observers believe that it is not common to any particular period of life but is encountered more frequently in middle life especially at the climacteric.

**Marriage.** The influence the marital state bears upon the occurrence of this disease has not been the subject of much comment in the literature. However, Majocchi in the *Giornale italiano della malattie veneree e della pelle* Milano, 1902, xxxvii, 526, states that in his experience it has been observed more often among married people whether with children or without and equally among multiparous or primiparous females. My own observations on this point are at variance with this view, as I have seen more cases in young unmarried people than among those who are married.

*Occupation.* As to the distribution of this condition among the various occupations it may be said it is found in persons in all walks of life, although opinion has it that people who lead a sedentary life are more frequently affected. As such, may be mentioned clerks, tailors, and professional people. Those persons who are engaged in pursuits which demand an extraordinary expenditure of nervous energy and render impossible the maintenance of a set routine for the normal wants of nature, such as eating, drinking, sleeping and defecation, apparently suffer in larger proportion than others.

*Predisposing Factors.* As predisposing factors may be mentioned the presence of chronic visceral diseases, particularly of the gastrointestinal tract, faulty habits of living, and the possession of a nervous temperament. An undoubted predisposing factor of great importance in the production of one type of pruritus of the perineum is the presence of local disease in the pruritic zone.

*Relation to State of General Health.* Although occurring quite frequently in neurotics, in stout people, and in those who perspire freely it is, nevertheless, found quite as frequently in people of general good health. Hence the state of general health appears to have no appreciable effect. Very often the greatest sufferers are highly nervous women whose life contains elements of disturbance or exasperation. Gaucher writing in the *Bulletin Médical*, Paris, of 1903, claims that it affects as a rule tuberculous subjects, while Lamy in the *Bulletins et mémoires de la Société Médicale des hôpitaux de Paris* reported cases of pruritus occurring in tabes. These, however, must be considered as gross oddities and not as the general rule. My own observations have been at variance with the first claim, i.e., that it affects as a rule tuberculous subjects, but I have seen cases of tertiary syphilis which exhibited an undoubted temporary pruritus in certain areas of the skin presumably supplied by the nerves then being affected by the luetic process.

My own observations on the *relation of this disease to general health* have been quite puzzling and at times seemingly paradoxical. I have often observed this condition in people who at first glance one would pronounce in perfect health: big, strong, well-developed men with no anemia, no physical weakness of any variety and with no apparent

visceral disease whatsoever. Moreover, in that type of case which I am now relating, the subjects were not of a particularly nervous temperament and in one or two instances were actually plethoric. In most of these cases I have found upon examination and a consideration of their history that they had seminal vesicles which were greatly distended owing to voluntary suppression of the sexual act. Upon interrogation I found that many theological students were affected with this disease chiefly on the basis of this chronic distention of the seminal vesicles. An identical phenomenon was noticed in young men about to be married and in widowers who had been leading a chaste life. I think it noteworthy to mention these things here so as to furnish a clue in cases that are apparently in sound health but, nevertheless, suffer from this condition.

*Heredity.* Apparently heredity is of no importance, or at least no history of heredity is obtainable in any case. This may be due to a disinclination on the part of elders to discuss their infirmities with the younger generation. As we proceed further in the discussion of this disease, I believe we shall come to the logical conclusion that there is no organic reason why this disease cannot be a hereditary one even though actual evidence is lacking.

*Occurrence in Animals.* In my study of this disease my researches led me to the field of comparative anatomy and later on I shall mention several interesting observations as to the occurrence of this disease in animals.

With the kindly cooperation of Dr. W. Reid Blair, Veterinarian and Pathologist to the New York Zoological Gardens, the following interesting sidelights on the subject of pruritus ani have been brought forth. The collection of animals at this zoo is the largest and most diverse in the world, and the observations mentioned below are chiefly based on Dr. Blair's experience which extends over some twenty-six years and is aided by approximately 40,000 autopsies.

The widespread belief that some animals are by nature filthy and invariably infested with lice, fleas or pediculi might lead the reader to regard an attempt to study the occurrence of itching, due to disease among them, as being impossible. Such a belief, however, is decidedly erroneous for the reason

that practically all animals are extremely clean if given the opportunity to be so. This even applies to the pig proverbially known as dirty. Under the ideal conditions of the Zoological Gardens the animals keep themselves indescribably clean. As for the occurrence of lice and other vermin—these are practically non-existent among them, although the casual observer might, upon watching the performance of any cage-full of monkeys, disagree with this view. The practice I am alluding to is that of these particular animals sitting in pairs engaged in the picking and eating of minute particles of scarf skin from each other's skin. These particles are analagous to the dandruff that many humans have on their scalp. The procedure, however, leads one who does not know what is actually being done, to surmise that they are picking vermin out of one another's fur. This, of course, is not the case. Their reason for picking and eating this desquamated skin is, I am informed, that it contains minute quantities of salt which have been excreted in the perspiration and have dried on the skin. Animals, therefore, particularly the mammals whose anatomical and physiological basis is, broadly speaking, identical with ours, are quite appropriate subjects for comparative study of this subject.

The only animals which show any tendency to develop pruritus of the anus are those of the horse and the dog families. These, particularly the domesticated species, not infrequently evidence the presence of this itching by their efforts to relieve it. A horse usually makes use of some convenient tree or post which he backs into and by rubbing from side to side obtains the necessary relief. The canine species when so affected place their rump on the ground, flex their hind legs and by means of their forefeet drag the anal region over the rough ground or floor. As to the cause of the itching in these animals: the horse so affected is quite frequently found to be subject to a variety of chronic colitis involving excessive fermentation in the bowel with accompanying distention. Constipation likewise occurs in horses as does also a variety of helmenthiasis similar to the human parasitic infection due to the whipworm. Undoubtedly the first mentioned conditions induce an indirect pruritus, while the latter may by the presence of the active parasites

directly irritate the perianal region, that is, cause a direct pruritus. Dogs, of all animals studied, have the largest share of intestinal and rectal affections. Constipation is very common, hemorrhoids a quite frequent occurrence, while occasionally fistulae develop in the anus or rectum. Exceedingly common is a variety of intestinal worm inhabiting the cecum and large bowel. Here then is sufficient pathology to justify the occurrence of pruritus of the anus.

In view of the explanation frequently offered—that it is induced by the eating of meat, it is interesting to note that the lion species are fed on approximately 12 pounds of raw red meat daily yet never evidence the slightest symptom of pruritus. This is not offered as proof of anything in particular but merely as an interesting observation.

The occurrence of a form of diabetes among the cat and the monkey species, without the concurrence of pruritus of the anus, is likewise of interest in view of the somewhat prevalent opinion that the aforesaid disease is a cause of pruritus of the anus.

The occurrence of chronic visceral diseases among the animals is in general a relatively infrequent occurrence. Monkeys being chiefly affected with pulmonary tuberculosis, are subject to pneumonia and nephritis, while quadrupeds are mostly subject to rickets, osteomalacia and various forms of acute gastritis or enteritis. Deer are occasionally troubled with a gastroenteritis. All animals are remarkably free from neoplasms.

This relatively low incidence of visceral disease is of course due to the more or less ideal hygienic conditions under which the animals live, the care which is taken in the selection of their food and drink and the constant expert veterinarian attention given them by Dr. Blair and his assistants. Years of experience with these animals has taught them the proper foods and conditions necessary, with the result that the incidence rate of disease of any kind is kept remarkably low. Such as does occur generally does so because of a deficiency or a fault in food or a sudden change in environmental conditions. Then, too, the animals are aided by their instinctive cleanliness and the avoidance of substance that would be deleterious should such accidentally find its way into their provender.

In general, therefore, the conclusions we may draw from these observations are that pruritus of the anus does occur among animals and that such occurrence is chiefly in those animals that have gastrointestinal and proctological complaints simulating, if not identical with, diseases of man. The mechanism in the production of the pruritus, as well as the mode of attempted relief, appears to be fundamentally identical in both animals and man.

## CHAPTER II

### SPECIAL CHARACTERISTICS

#### COURSE OF THE DISEASE

Pruritus ani, even in those cases which seem profoundly acute, is essentially a disease of extraordinary mildness in its incipience and slowness in development. It is persistently chronic and sometimes periodic in its manifestation.

*History.* The suffering is not great at first and as a matter of fact is often considered quite a joke by the patient at its inception. Patients will tell of faint itchiness being present for months or years prior to the attack. This they consider at the time as unimportant and a not altogether unpleasant sensation. Some will relate of experiencing an orgasm incident to their efforts at soothing or relieving this itching.

The most impressive recounting of the history of one afflicted with this malady was that related by a patient of Dr. Granville S. Hanes of Louisville, Ky. His words were, "I have a small family, but make a good salary. I have a number of friends who are excellent doctors and I am sure that each of them has made every possible effort to relieve me. They have been reasonable in their charges but today I am in the deplorable financial state of having spent all my means and am still afflicted with a disease which has almost wrecked my life and has made it impossible for me to care for my family as I have always hoped to. I have had many experiences and have suffered in numerous ways, but nothing which has otherwise affected me has been comparable to this disease."

The foregoing is not unlike the experiences most patients, who suffer from this condition, relate.

*Course and Mode of Onset.* This to my mind constitutes a true prodromal stage during which a foundation is being laid in the cellular and intracellular elements of the perianal and extra-rectal zone for the establishment of that pathophysiology symptomatized as pruritus. During this period no

symptoms are referable to the pruritic zone save a vague sense of something gently irritating the substance of the skin. No pathology is evident in the skin at this time, either in its epidermal or dermal layers. Urine, blood, etc., are normal apparently in the vast majority; hence the existence of an incipient pruritus at this stage is difficult to more than surmise, inasmuch as so much depends on purely subjective symptoms, the delicacy of which varies in accordance with the multitudinous temperaments found in the practice of medicine. What would be termed excruciating pain by some might be termed merely annoying by a more phlegmatic person. Similarly, a description of a sensation of itching is tossed on the waves of temperament, and what is barely noticeable to one individual is torture to another.

After a variable prodromal stage, that acute stage of pruritus, for the relief of which the patient is so often referred to the rectal surgeon by the general practitioner, breaks forth in fury and concerning this, temperaments seem to agree more nearly. This acute stage in direct contrast to the slow development of the prodromal stage is very rapid in its development. In reality, fury is but a mild word in the description of the tremendous annoyance this disease causes its victims. The very simplicity of the condition, itching, renders the patient expectant of simple and prompt relief. He cannot understand why a solitary condition not associated with even slight constitutional disturbances should remain invincible. It is, indeed, a reflection on the art of medical practice that more of these cases are not relieved promptly instead of being allowed to drift along suffering the pangs of torture until some charlatan assumes the rôle of savior. Some physicians classify many of these cases as purely nervous, but while the condition often has but a vague significance for the physician it is quite a problem to the patient. To the doctor it means an indefinite symptom referable to many pathological causes, sometimes to none, but to the patient it means an agony beside which pain would be a pleasure. The attack lasts from a few minutes to a few hours; as a rule, the itching is greater nocturnally. The actual phase of acuteness may last a few days or a few weeks. Itching may be subdued for some time and start again, due to some article of diet or drink causing frequent intercurrent,

acute exacerbations of the process. Sometimes the torture is so great that the general health is impaired and the patient's nervous system is wrecked. It thus causes great mental and physical dismay. Often it is so intense that the patient is driven to desperation and says he would welcome death. Indeed, some threaten suicide unless relieved. The attacks are followed by mental exhaustion and general weakness and eventually hypochondriasis.

*Duration.* The condition may persist for a long time, sometimes for months and sometimes for years, as it is a very stubborn condition, difficult of mitigation. In some cases the pruritus is continuous; in others, spasmodic with intervals of complete disappearance between the attacks. One case of this type of thirty-three years' duration is on record. I have had one case whose authenticity I proved, which was of thirty-eight years' duration. Hence, it is a most annoying ailment, very persistent, intractable and distressing. At times it is so distressingly annoying that patients refrain from taking outdoor exercise and from going into society. There is no tendency to malignant changes, but carcinoma of the rectum and of some other viscera, in its incipience, may be accompanied by anal pruritus. The disturbance, out of all proportion to the apparent causes at work, lowers health, and loss of weight, chronic insomnia, or even insanity may result. The effect on the nervous system of the patient is such that it may change his entire character.

In some cases, as time goes on and the affection persists, the attacks seem to grow milder either by virtue of a natural decrease in their violence or by a natural dulling of the senses to the irritation. In others, time does not palliate, the condition appearing to go from bad to worse. A gradual kraurotic termination, after many years' duration, seems to result in the relief of other cases.

*To Recapitulate.* The *history* in these cases is vague and seemingly benign, the *onset* gradual up to a certain point, whence it assumes an acute viciousness; the *course* is exceedingly chronic with remissions more or less complete; the *duration* is a matter, in most cases, of years.

In general, it seems wise to bear in mind the fact that many of these cases, because of the continued irritation to the nervous system and the great loss of sleep, become highly

excitable and nervous. Hence, a doctor who gives this condition but superficial thought is prone to classify unjustly these persons as 'neurotics' or 'hypochondriacs', thereby mistaking effect for cause.

### DESCRIPTIVE FEATURES

#### SUBJECTIVE: CLINICAL SYMPTOMS

The predominant subjective symptom is the persistent, tantalizing and almost intolerable itching which seems next to impossible to relieve. At times, this is practically unaccompanied by any other symptom, yet by itself causes more misery than actual pain would. Indeed, many patients who are victims of this malady express a preference for actual pain if suffering must be their lot. The severity of this affliction, the capacity it has of rendering life almost unbearable, and the extreme misery that it means to one affected, can be appreciated when one hears of the measures to which patients will go in order to obtain relief and of the threats of self-destruction that they make unless they be afforded relief. We can readily understand this desperate frame of mind, alarming both to the patient's friends and to the doctor, when we see cases in which the affection has been so incessant and severe that there has not been a night's rest for three months past. Actual cases of suicide resulting from desperation because of this plight are on record.

Besides the pruritus *per se* there are many other symptoms which are either a consequence or a concomitant of it. Then, too, there are not a few symptoms which are those of a coexisting pathological condition, and merging their manifestations with those of the pruritus they become associated with it.

Because of the paramount importance of the symptoms of pruritus and in order to obtain a more definite idea as to its exact characteristics, I have deemed it wise to submit the manifestation to a careful and detailed analysis as to its various components. Thus I will, in the paragraphs which follow, elaborate upon its location, diffusion and radiation, occurrence, duration, character, and those factors which increase or decrease it. Symptoms of consequence and symptoms referable to associated conditions will then be treated.

*Location.* The subjective manifestations of this disease are referred to those parts of the perianal skin within a radius of 2 to  $2\frac{1}{2}$  inches of the center of the anal orifice—the mucocutaneous margin or the terminal inch of the anal canal; in other cases it is referred to the skin over the scrotum, labia or symphysis pubes. The anterior and the posterior raphes of the perineum are the seat of the most severe symptoms, but the whole region may be severely affected. Here and there throughout the area, hyperesthetic foci, in which the pruritus originates and increases, may be demonstrated. For the sake of convenience this entire area can be considered clinically as one area, the pruritic zone.

In a certain part of or throughout this zone the dread symptom of pruritus runs riot.

*Diffusion and Radiation.* Diffusion of the pruritus occurs throughout the pruritic zone until it involves the entire area. It is not, however, a true radiation in the sense that we speak of pain radiating, that is, it does not follow the course of a particular nerve distribution. Scratching tends to generalize the pruritus; also emotional stress.

I have observed, however, that quite frequently these patients complain of the presence, though in a milder form, of pruritus over the medial side of the thigh or the posterior aspect of the calf. This follows the distribution of the posterior cutaneous nerve of the thigh branch of the first three sacral posterior roots. In these instances radiation most surely occurs or has occurred. It is found associated with some of those cases of the indirect type which I shall describe at length later on. In many of these cases the vulva, the scrotum and the undersurface of the penis are also involved, and invariably these cases are of the indirect type. The skin over the coccyx and the base of the sacrum may be affected either by diffusion or by radiation.

*Occurrence.* This distressingly dominant sensation of itching is notably more frequent at night, although by no means confined to those hours; especially is this the case in an aggravated form of the disease, in which type it may persist almost equally during the day, and is such a source of mental disturbance that it seriously encroaches upon the life of the individual. At times, a monomania on the subject of this anal affection develops in this type of patient.

Indeed, this is the natural sequence of spending night after night in a wakeful, wretched vigil, with at best only a fitful slumber from which he often awakens himself by his unconscious scratching. Immediately upon retirement the patient's misery commences; for, directly he is warm and relaxed, attacks occur which make sleep an impossibility. Irritable and exhausted toward morning he falls into a fitful slumber. Before awakening another attack quite often occurs. Grinding of teeth during sleep is a common complaint. The sleep that occurs seems to leave the patient as tired as when he went to bed, and at times more so.

Irritable, worn-out and with racked nerves the patient starts his day's work only to face the same ordeal at the end of his day's labor. I have had several of these patients reverse their habits, i.e., sleep during the day and stay awake or work all night. In these instances, curiously enough the pruritus also changed its time, the attack occurring in the day time instead of during the night.

In some people, particularly in those known as being of a nervous type, the trouble is often as noticeable by day as by night, attacks occurring two, three or even ten times a day. The number of attacks varies directly in proportion to the excitability of the nervous system of the patient.

Sometimes the attack is provoked by accidental contact or the slightest friction on the part, as, for example, by undergarments which fit too tightly in that locality. Exercise of an active nature often induces paroxysms, as does also the coming into a warm room after being out in the cold. In others the attack is precipitated by a warm bath. It would appear, therefore, that heat tends to induce the pruritus.

It would seem from the foregoing that the occurrence of the pruritus depends upon the excitability of the individual. This, of course, varies among individuals and even in the same individual at different times. It is likewise dependent upon various environmental factors, such as heat, cold and contact.

*Duration.* The duration of the attacks is a matter of great variation even in the same case, sometimes lasting with great vigor from five to ten minutes, and at other times persisting in a semi-abated condition over a period of hours. As a rule, however, the attack lasts from ten to fifteen

minutes, reaching its climax in about ten minutes and then gradually subsiding during the next few minutes. It is, therefore, sometimes spasmodic with periods of comparative freedom from itching (which, of course, are quite welcome to the patient), and at other times more or less continuous.

In many, the paroxysms start during the latter part of the evening, usually when the patient has just become warm and comfortable in bed and has become thoroughly relaxed or has fallen into a preslumber state. Without decided prodromata a relentless paroxysm of itching descends upon him, torture being incessant, with only fitful remissions throughout most of the night. Usually towards morning, due to supreme fatigue or complete exhaustion, the patient snatches a troubled sleep which, however, is singularly devoid of refreshing qualities. Occasionally near the waking time a paroxysm recurs. Often these patients complain that this has been the state of affairs nightly over a period of weeks or months. What wonder that they become mentally warped!

*Character.* The character of the pruritus is especially distinctive in its furor, its capriciousness and the apparent discrepancy in proportion between the symptom and its apparent causes; for at times no cause at all is evident. Although various modifications of the sensation occur from time to time, such as burning, stinging, aggravating pain-like sensations, smarting or biting, the most constant is that peculiar state of irritability of the skin which we term plain itching. Sometimes the parts are painfully sensitive, and I have had more than one patient describe it as a painful, tickling sensation that seemed to demand scratching. Investigation of the sense areas of the skin shows no alteration in pressure, heat or cold sense but quite frequently a hyperesthesia of epicritic sensibility. This is most often noticed along the anterior and posterior raphe.

Most of the patients complain that the itching does not seem to be on the skin, but rather in the skin, and they are quite keen in observing that rubbing the parts is more prone to give relief than actually scratching. At times, the itching partakes of the character of formication or tickling, although this is not its usual type. The desire to scratch is almost irresistible. It varies from temporary discomfort in

some cases to a most profound misery in other cases, the severity being governed largely by the temperament of the patient. At times, it is described as a painful itching, and I have observed some cases in very intelligent people who have described it as almost painful. This might tend toward the belief of some relation of the sensation of itching to that of pain. It is at best a most distressing complaint, and is very difficult to bear. Indeed, many patients have said they would rather bear severe pain than this particular sensation. It may, therefore, be said that it is productive of great physical torture and mental despair.

It is related that in the Orient the Chinese have for centuries used a method of punishment which, for producing agony in its victim has no parallel save this distressing disease which we are discussing. The form of punishment alluded to consists in binding the victim securely and then allowing a small drop of water to drop incessantly upon his head from a tank of water suspended directly above. The constant repetition of this tiny shock to the nervous system is reputed to have caused dreadful agony ending in insanity within as short a time as eighteen to twenty hours. In a similar manner the constant repetition of the minute irritations caused by this disease lead to a dreadful distortion of the mental make-up, and may indeed change the patient's entire character. His disposition becomes cruelly warped, he becomes irritable, and, as the affection persists, discouraged, melancholic and frequently has suicidal tendencies. Some sufferers are so harrassed by the itching and the rawness of the parts, that walking actually becomes painful to them, and they become unfitted to attend either to their business or social duties.

One of my patients, a physician, states that "it is a burning sensation which is not relieved by scratching and is not properly orientated by tactile sense. This burning is somewhat similar to itching, but more like that produced by acid on the skin. The ordinary form of itching feels like something very superficial, but this is a burning itch which seems to involve the whole thickness of the skin."

There are certain conditions and circumstances that have a decided influence on the pruritus. Thus we find that the pruritus is *increased* by extremes of temperature and sudden changes in temperature, as, for example, leaving the cold

air and coming into a warm room. Low temperatures, particularly when associated with a low humidity and windiness which favorably influence evaporation and reduce the glandular activity of the skin to a minimum, apparently induce a condition where the pruritus makes itself more evident. Dry cold, then, seems to be the weather which affects this condition most unfavorably. On the other hand, heat, especially the artificial heat of our dwellings, induces an attack in some.

Scratching fastens, increases and generalizes the pruritus as does also emotional shock, mental strain, overwork or anxiety.

Moisture, either from pathological exudates or from perspiration, likewise greatly increases the pruritus. This is especially noticeable during the warm weather and among those who perspire freely. The perspiration, by getting into the minute excoriations or fissure present, causes, particularly when walking, a series of acute stinging pains.

Exercise sometimes brings on an attack, and woolen underwear or tight fitting clothing is also prone to aggravate the condition. The act of defecation or a long continued seated posture also may increase or precipitate an attack.

As to those agents which *decrease* the pruritus not much can be said. Extremely hot applications relieve some, while gentle rubbing temporarily alleviates others. Scratching gives a very temporary relief, but in the long run conspires actually to increase the symptom it is intended to relieve.

In addition to this prominent and indeed essential symptom of the disease there are various consequential or incidental symptoms.

*Symptoms of Incidence or Consequence.* As such must be mentioned anorexia and loss of weight in some cases amounting to an emaciation. Because of the terrific strain that this protracted excitation throws on the nervous system, various forms of mental exhaustion or slight mental aberrations become evident. Thus some of these patients become neurasthenics, hypochondriacs or the victims of melancholy. Chronic insomnia is a very frequent symptom. In some, insanity actually develops either in the form of a monomania on the subject of itching or crawling things, or in the form of a suicidal mania. In protracted cases the

patient's general health and nutrition fail from prolonged insomnia and the nervous wear, and his character becomes changed to that of a highly nervous and excitable type. It is interesting to note that bona fide cases of abortion resulting from this ailment are on record. Henske of St. Louis reported a case in 1888-9 which twice aborted because of paroxysms of pruritus of the perineum.

*Symptoms Referable to Associated Conditions.* It may be stated that in the class of cases, later described under the name, indirect pruritus, which have associated a visceral disease, these symptoms naturally are contributed to the general clinical picture. Thus in a case of chronic, atonic, intestinal dyspepsia we have the flatulence, constipation, etc., attendant upon that condition. A chronic prostatitis or chronic urethritis naturally adds its particular symptoms. A catarrhal proctitis, cryptitis, or papillitis adds the symptoms of tenesmus, local pain and the presence of a mucoid, or mucosanguinous discharge. A polyp in the rectum would cause the addition of a sense of bearing down to the general train of symptoms. To elaborate on what the symptoms are of each of these associated diseases would, to my mind, be an unjustifiable digression; hence, I am content to make the brief statement that the symptoms of diseases associated with pruritus add to the pruritic symptom their own special characteristics.

In the other type of cases, that is, of direct pruritus, the inciting agent, such as fissure in ano, naturally maintains its own characteristics irrespective of the pruritus it is instrumental in producing. Similarly, the symptoms of condylomata, fistula in ano, hemorrhoids, or varicose veins retain their identity although overshadowed by the intensity of the pruritic symptom.

#### OBJECTIVE: PATHOLOGICAL FINDINGS

The objective manifestations of this disease conform in site of occurrence with that of its subjective manifestations.

The region affected comprises an elliptical area  $2\frac{3}{4}$  inches anteriorly and posteriorly from the center of the anal orifice and for a distance of about 2 inches laterally on each side from the same point. The mucocutaneous margin and the terminal  $\frac{3}{4}$  of an inch of the anal canal are likewise the seats

of both clinical symptoms and pathological signs. For the sake of convenience we may call this entire area the pruritic zone. An examination of this area affected clinically will show in the majority of cases a pathology of one of three types.



FIG. 2. Early stage of pruritus ani with area of inflammatory changes clearly shown. The skin here is dry, distended with serum, and a shiny red color throughout.

It will be borne in mind that at some time, even in the presence of marked subjective manifestations of which the pruritus is the chief one, absolutely no gross pathology is seen. I have observed innumerable cases in which the pruritus existed for a long time prior to any apparent tissue pathology, but I have further observed that the itching is

never quite as severe as when some break in epidermal continuity occurs.

Needless to say, these cases, with pruritus present but no objective manifestation, are cases of comparative recency



FIG. 3. Later stage of pruritus ani. The area is thickened, moist, gray and presents the appearance of being water soaked.

for sooner or later a pathology does develop which finds classification as one of the types described later.

The particular findings in any one of the types described below is modified in degree and extent according to the time it has existed because the changes are progressive and in direct proportion to the duration of the disease or its complication by other features.

The *first type* represents a subacute or chronic dermatitis of traumatic origin and is often the predecessor of the second type to be described. An examination of the skin in the pruritic zone in this type shows, in an early stage, an abnormal smooth fullness of the skin with a diffuse, dry, shiny redness (Fig. 2). The skin also seems somewhat thicker and tougher than normal. Later the integument assumes the appearance of wet leather or pig skin, and is thick, tough and indurated in consistency. All natural ruddiness has departed from the skin, as well as the normal pigment, and it looks moist, soggy and of a grayish white color (Fig. 3). The skin may become lichenified or hyperkeratotic, and, furthermore, because of hypertrophy it quite often becomes folded into broad radial creases, folds or ridges with consequent accompanying sulci between them. In these sulci a thin, watery fluid collects and this moisture being an abnormal condition naturally irritates and causes a progression of pathology. In early cases no lesions are evident, the skin being quite evidently unbroken. These changes are particularly evident in the anterior and posterior raphe. The pruritic zone in very chronic cases has fairly well-defined borders and appears circumscribed. The mucocutaneous margin is not fissured, but both this region and the lower  $\frac{3}{4}$  of an inch of the anal canal appears congested. The sphincter is in the majority of cases slightly hypertonic. The pathological diagnosis in such a case is that it is a chronic dermatitis probably of traumatic origin.

My interpretation of this stage is that it represents a normal reaction on the part of the skin and mucous membrane of this region to the rubbing, scratching and other irritation to which it is subjected by the patient in his attempts to relieve, annul or inhibit the sensation.

The *second type* is that in which bacterial invasion is quite evident. The continuity of the skin is decidedly broken by abrasions and excoriations resulting from attempts to relieve. It, therefore, looks a dull red and has a cracked surface from the fissures of which oozes a sticky exudate. Sometimes a diffuse rose-colored skin surface, over which is scattered moist, red, concave erosions, is seen. These erosions ooze serum profusely (Fig. 4). In the interval between the fissures previously mentioned, the skin occasionally shows a minute

vesiculation or more often considerable scaling of the epidermis. When the condition has reached the stage where it may be termed subacute or chronic, the changes in the skin are more pronounced and the area involved appears a dull red and feels harsh and rough to the touch. It is thick, tough and indurated in consistency. The infiltration and induration are similar to what is usually caused by the deposition of an



FIG. 4. Pruritus ani with excoriations and erosions. It is in cases of this type that bacterial invasion has been demonstrated. (See Figs. 23, 24, 25.)

inflammatory exudate in a tissue of a low degree of vitality. The mucocutaneous margin is quite often fissured, sometimes in a multiple manner; the sphincter is decidedly hypertonic, and the mucous membrane of the lower  $\frac{3}{4}$  of an inch of the anal canal deeply congested, dry and tough.

Pathologically this condition is a subacute or chronic dermatitis probably of infective origin.

The relation of these two types to each other is variable. In the majority of cases the first precedes the second, but

in many cases the disease starts without the occurrence of traumatic dermatitis.

In the *third type* we notice that the skin is evidently the seat of atrophic changes. It has become depigmented or has a soggy appearance and is of a grayish white color. The hypertrophic folds of the other types are present but have lost their natural ruddiness. The sphincter may or may not be hypertonic. The lower  $\frac{3}{4}$  of an inch of the anal canal is harsh, white and leathery. Pathologically, the condition is one of kraurosis.

*Recapitulation.* We find some cases with no gross pathology at all; in those cases with gross pathology the findings fall into one of three pathological pictures. These pathological pictures are either, first, a chronic productive dermatitis; secondly, a subacute or chronic exudative dermatitis; thirdly, a condition of kraurosis. These various groups of findings are modified in degree and extent according to their chronicity and merge one into the other in accordance to the occurrence of infection complicating a simple productive dermatitis, or the end-result of kraurosis in either or both.

#### MICROSCOPICAL PATHOLOGY

When tissue from the pruritic zone in a series of cases of this disease is subjected to microscopical examination the pathological findings are found to be one of three types:

1. In a certain minority percentage which are clinically early, even though the pruritus is intense, there is no pathology of any sort whatever; the tissue is normal. This type corresponds with the type in which no gross pathology is found. Needless to say, this type merges into that of the succeeding one (Fig. 5).

2. In those cases, which in the gross, present evident pathology but no evidence of impairment of epidermal integrity the following processes are to be found: Hyperkeratosis, a thickening and proliferation of the stratum mucosum due to hyperplasia.

Consequent upon this there is a great growth downward of the inter-papillary processes (Figs. 6 and 7). Connective-tissue hyperplasia (Fig. 8) is also present and a marked sclerosis of the connective-tissue of the corium occurs which extends well up to the base of the papillae and even up into

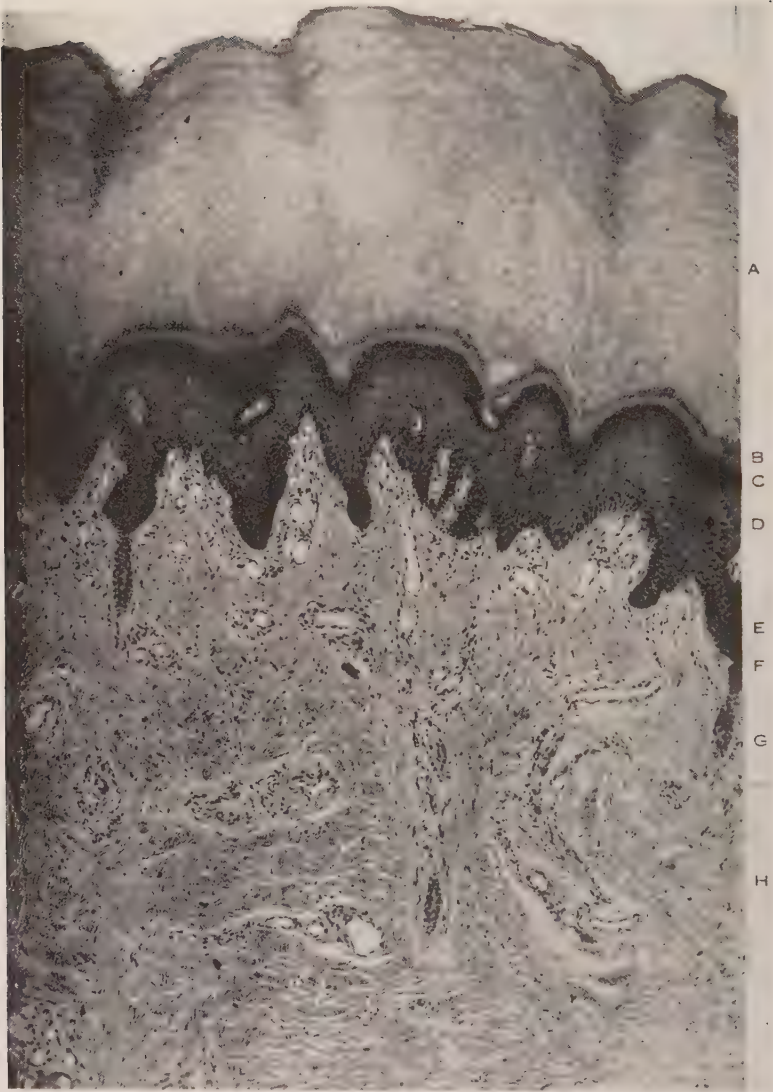


FIG. 5. *Clinical Diagnosis: Normal. Histological Diagnosis: Normal skin. Features: Well-defined layers from above downwards. A. Stratum corneum; B. Stratum lucidum; C. Stratum granulosum; D. Stratum mucosum (rete malpighii); E. Stratum germinativum; F. Basement membrane; G. Stratum papillare; H. Subcutaneous tissue. Stain: Hematoxylin and eosin.*



FIG. 6. *Clinical Diagnosis:* Anal pruritus without evident lesions of the skin. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Some hyperkeratosis, marked hyperplasia of the stratum mucosum with increased pigmentation; extensive increase in the interpapillary downgrowths; marked diffuse round cell infiltration of the corium; marked increase in the fibrous connective tissue element of the corium. A large tactile corpuscle is to be seen. The tactile corpuscle of Meissner is seen surrounded by cellular infiltration. The walls of the blood-vessels seem sclerosed but there is no endarteritis.



FIG. 7. *Clinical Diagnosis:* Anal pruritus of great chronicity but no lesions of the skin evident. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Hyperkeratosis, hyperplasia of stratum mucosum, great downgrowth of interpapillary processes; marked sclerosis of the fibrous connective tissue element of the corium. A tendency toward hyalinization of the epidermal cells is noted. *Stain:* Hematoxylin and eosin.

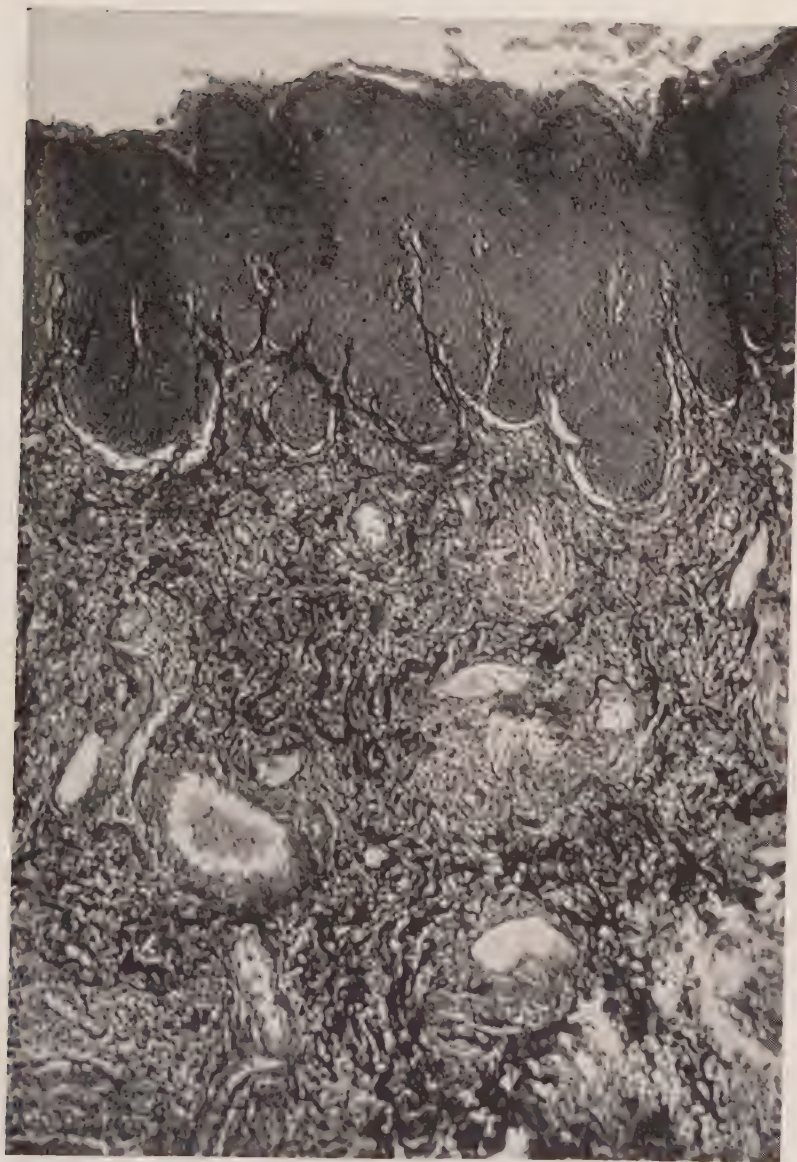


FIG. 8. *Clinical Diagnosis:* Anal pruritus without lesions of skin. *Histological Diagnosis:* Chronic productive dermatitis (almost to the point of kraurosis). *Features:* Marked sclerosis of the fibrous connective tissue of the corium extending up into the papillae and surrounding the blood-vessels. *Stain:* Van Gieson.



FIG. 9. *Clinical Diagnosis:* Anal pruritus without skin lesions. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Marked sclerosis of the fibrous connective tissue of the corium extending up into the papillae. *Stain:* Picro-fuchsin.

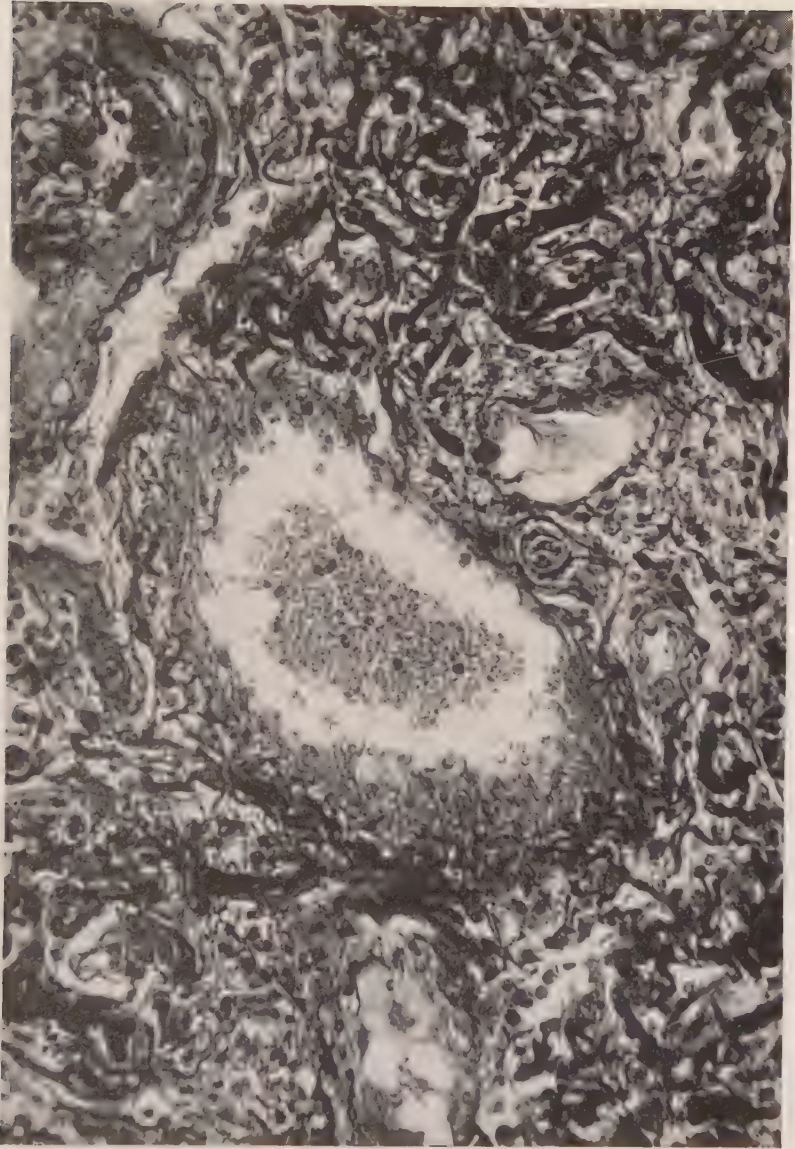


FIG. 10. *Clinical Diagnosis:* Anal pruritus without lesions of skin. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Blood-vessel surrounded by sclerosed fibrous connective tissue strands. No endarteritis is revident. *Stain:* Van Gieson connective tissue stain.



FIG. 11. *Clinical Diagnosis:* Anal pruritus without evident lesion of the skin. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Same as Fig. 12. Lower magnification to give more general view of the section. *Stain:* Hematoxylin and eosin (special formula).

the papillae themselves (Fig. 9). Both Figures 8 and 9 are specimens of such cases stained by Van Gieson stain. This shows up particularly well the connective-tissue in a section. The blood-vessels are not dilated but are surrounded as is every other structure in the corium, by a collar of sclerosed connective-tissue (Fig. 10). Scattered infiltration of the corium by a cellular element which is composed chiefly of round cells, also occurs. This cellular infiltration is not perivascular hence it is not due to a blood-borne toxin (Fig. 11). There is also noted in some cases an increased pigment in the stratum granulosum with occasional deposit of pigment in the corium due perhaps to diapedesis of the red blood-cells.

The pathological diagnosis of such a section is that it is significant of a chronic productive inflammation probably of traumatic origin. The process is essentially a chronic one, although in some cases an acute exacerbation may be found superimposed upon this chronic productive dermatitis. In general the process can be said to vary in degree in direct proportion to its chronicity. Sections of this type of case show no bacteria when stained by the Gram-Weigert method, except as noted in the chapter on "Bacteriological Findings."

3. We now come to that class of cases in which bacterial invasion is evident. Clinically it may be stated that in all these cases a solution of continuity in the overlying epidermis has occurred through the agency of one or more of the mechanical forces. In other words, in those cases lesions of the skin are present.

In such cases we not only see that condition due to non-desquamation of hyperplastic epithelial cells known as hyperkeratosis but also a marked hyperplasia of the rete cells with intracellular edema (Fig. 12) tending toward vesiculation and hypertrophy and projection downwards of the interpapillary processes (Fig. 13). The connective-tissue element of the corium is decidedly increased (Figs. 14 and 15). We also note a marked subepithelial cellular infiltration in which the polymorphonuclear element is predominant, and some red blood-cell diapedesis (Figs. 16 and 17). There is marked dilatation of the lymph spaces, some vascular dilatation and a general edema of the tissue. Sections of this type

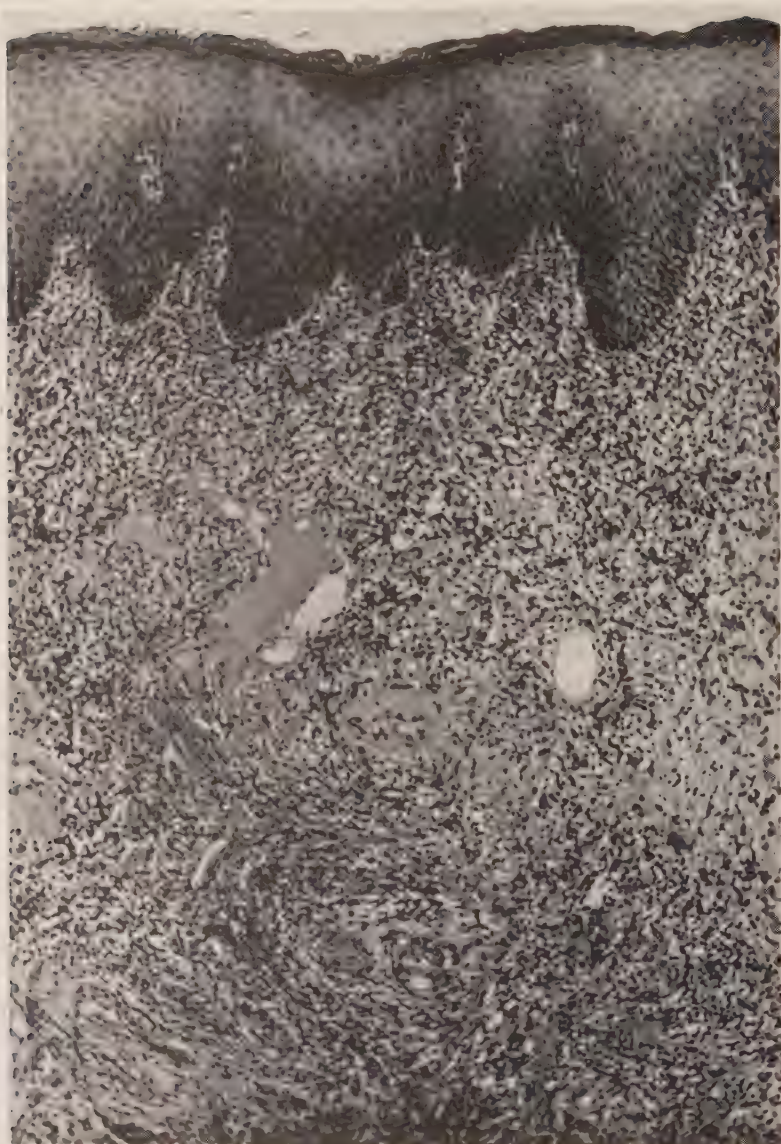


FIG. 12. *Clinical Diagnosis:* An acute exacerbation of a pruritus ani of short duration. *Histological Diagnosis:* Subacute exudative dermatitis of infective origin on a basis of chronic productive dermatitis. *Features:* Marked pigmentation of the epidermal layers; dilatation of the lymph spaces; diffuse cellular infiltration of the corium, particularly intense subepithelially; some vascular dilatation; general edema of the tissue. *Stain:* Hematoxylin and eosin.



FIG. 13. *Clinical Diagnosis:* Pruritus ani with skin lesions (very chronic). *Histological Diagnosis:* Chronic exudative and productive dermatitis of infective nature. *Features:* Tendency toward hyalinization of epidermal layers, hyperplasia of these layers, projection down into the corium of interpapillary processes; general infiltration of the corium, especially in subepithelial region, by both polymorphonuclear and round cells, edema of tissues and moderate increase of connective tissue.

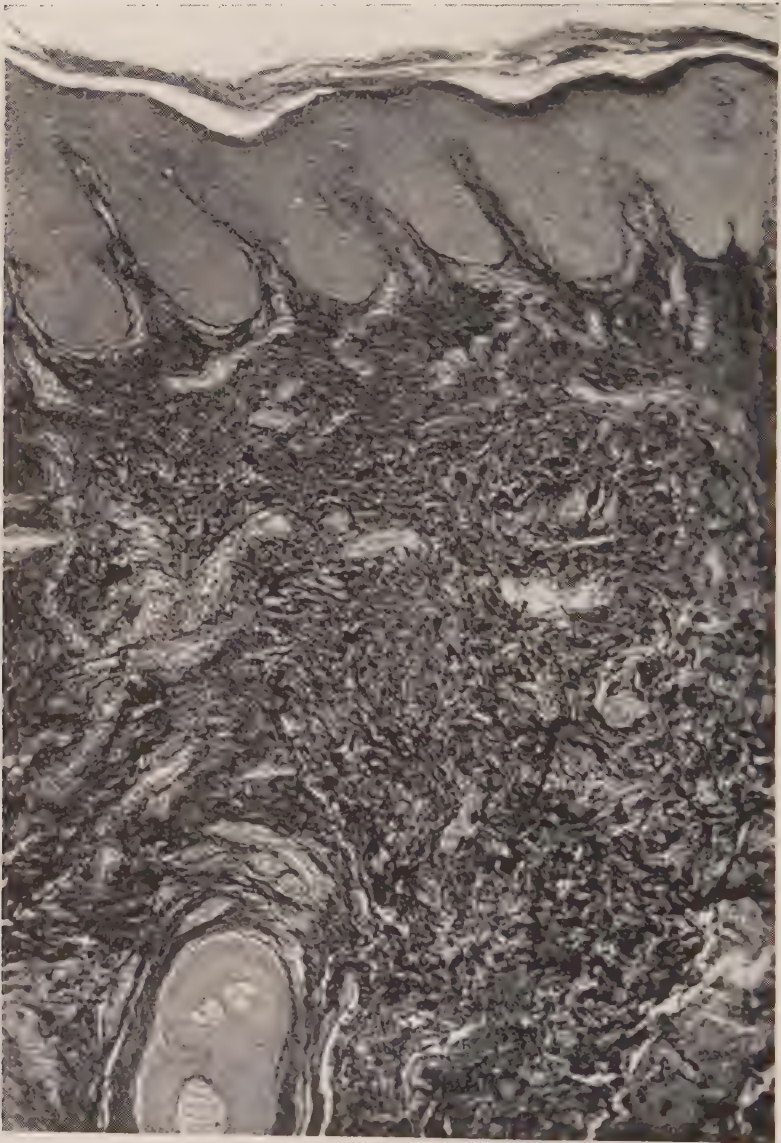


FIG. 14. *Clinical Diagnosis:* Pruritus ani with skin lesions. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* Very well-defined sclerosis of connective tissue of the corium extending up into the papillae around the blood-vessels and down into the subcutaneous tissues. *Stain:* Van Gieson connective tissue stain.

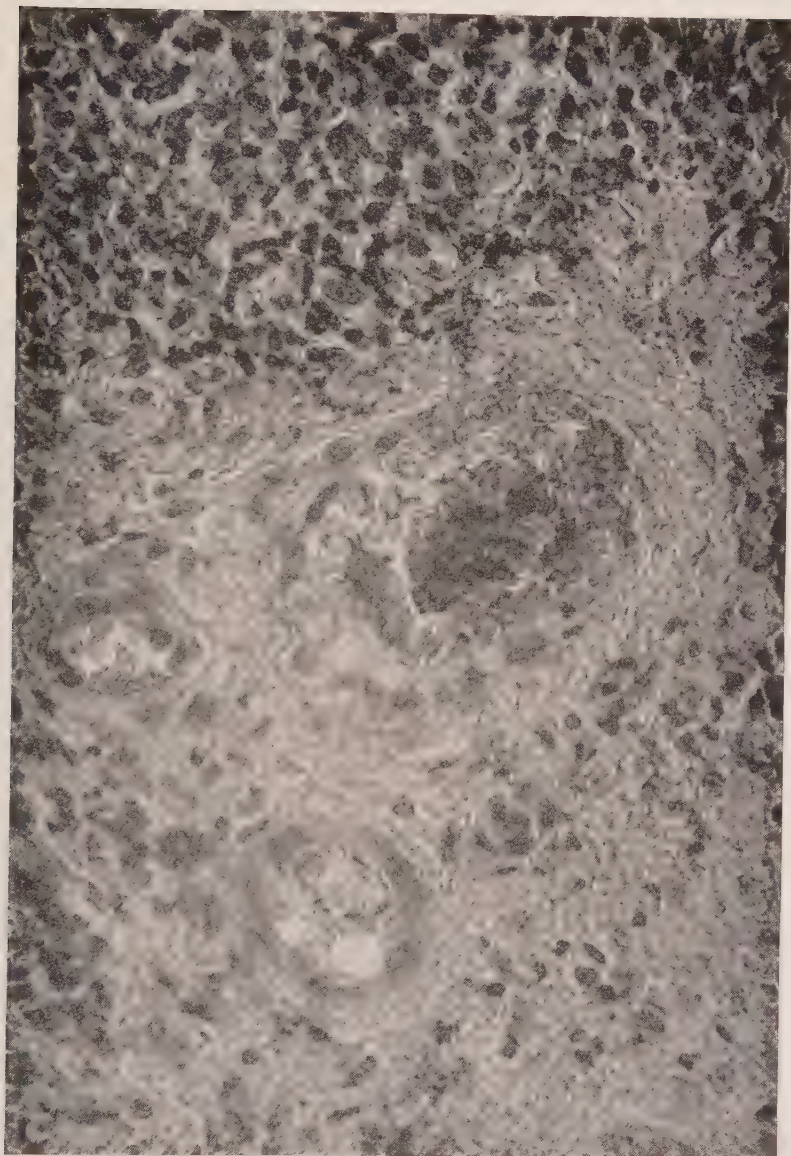


FIG. 15. *Clinical Diagnosis:* Acute exacerbation of a chronic pruritus ani. *Histological Diagnosis:* Subacute exudative and a chronic productive dermatitis. *Features:* Cellular infiltration in tissues near blood-vessel. Note that it is not a perivascular affair due to diapedesis through the vessel wall as it would be if blood borne. Also note thick-ended blood-vessel but absence of endarteritis. *Stain:* Hematoxylin and eosin.



FIG. 16. *Clinical Diagnosis:* Anal pruritus of great chronicity with lesions of the skin. *Histological Diagnosis:* Subacute dermatitis of infective nature superimposed on a chronic productive dermatitis. *Features:* Focal hyperplasia of epithelial cellular infiltration; evident impairment of epithelial integrity; tremendous sclerosis of connective tissue of the corium and some atrophy of the sebaceous gland. *Stain:* Hematoxylin and eosin.

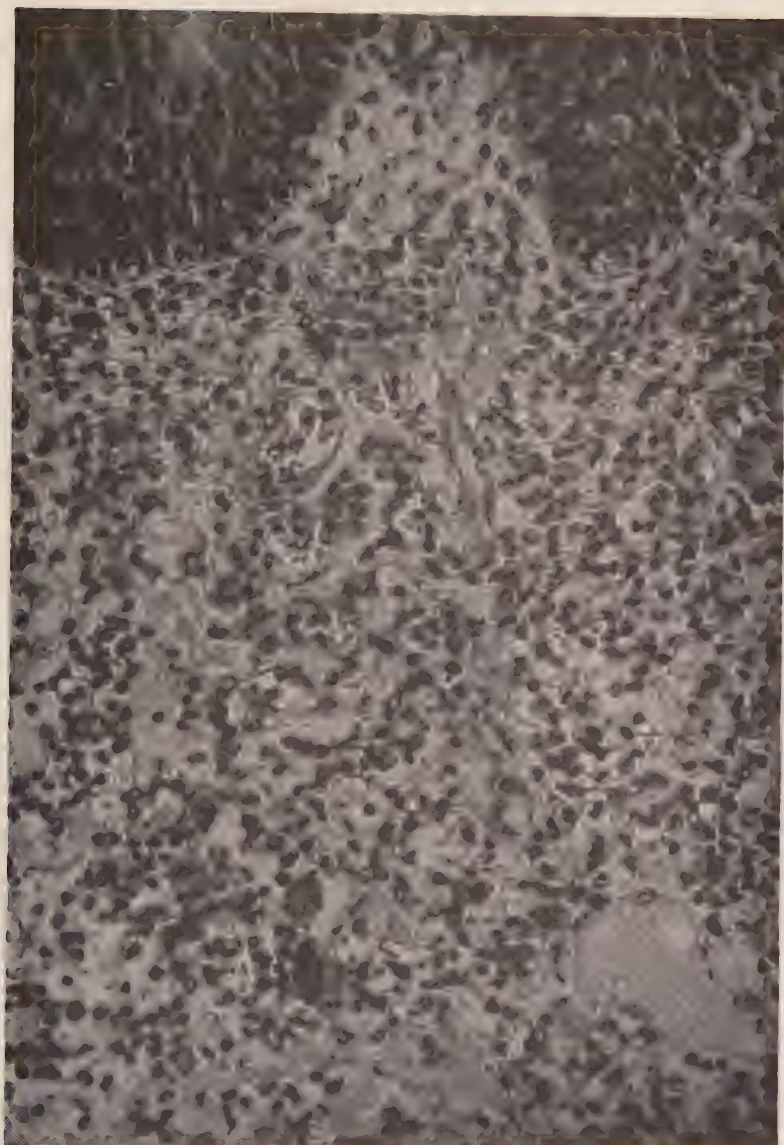


FIG. 17. *Clinical Diagnosis:* Acute exacerbation pruritus ani. *Histological Diagnosis:* Subacute exudative dermatitis on a basis of chronic productive dermatitis. *Features:* The character of the subepithelial cellular infiltration is a mixture of polymorphonuclear and round cell elements. *Stain:* Hematoxylin and eosin.

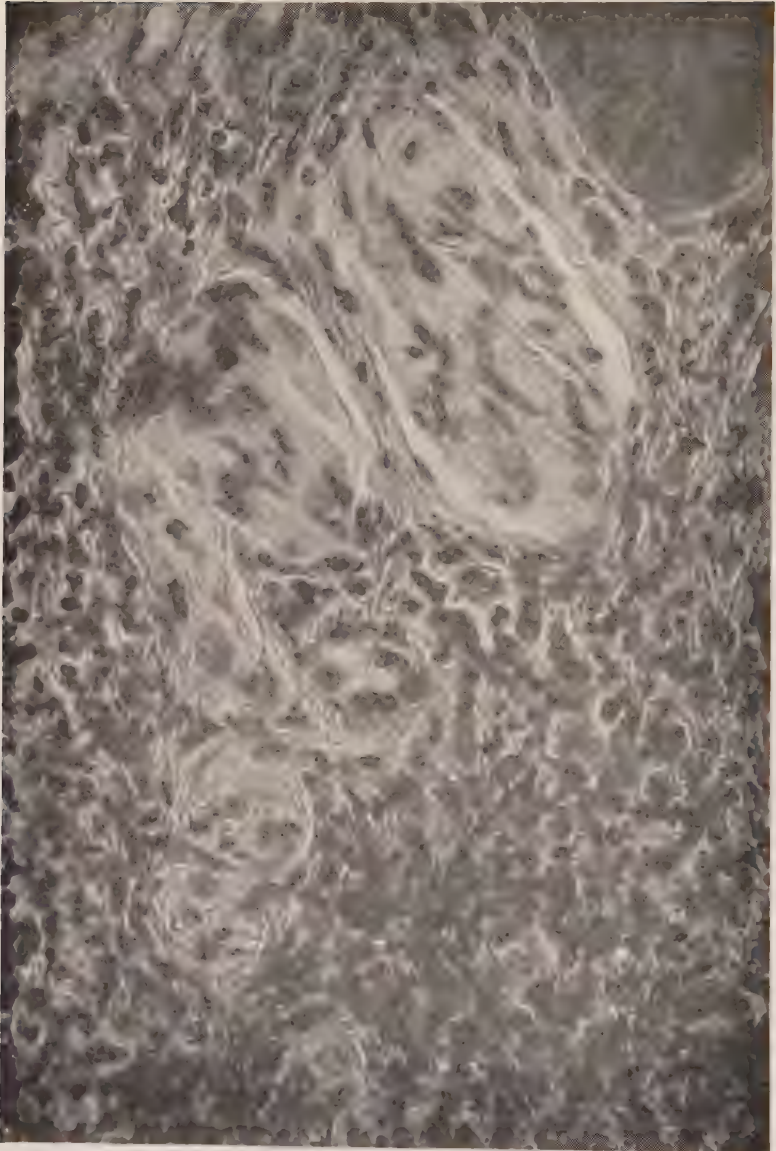


FIG. 18. *Clinical Diagnosis:* Anal pruritus without lesions. *Histological Diagnosis:* Chronic productive dermatitis. *Features:* This is a rare specimen histologically as it is as perfect a Meissner corpuscle as is ever seen. Some increase in connective tissue may be noted around the corpuscle and the cellular infiltration surrounding it is quite apparent. *Stain:* Hematoxylin and eosin (special formula).

of case occasionally show upon Gram-Weigert stains scattered clumps of bacteria in situ in the upper layers of the tissues. It must be remembered that we have as yet no satisfactory methods of staining tissues to show Gram-negative microorganisms; hence, we cannot definitely say that such organisms as *B. coli* are not found.

The picture is that of an acute or subacute exudative dermatitis in some cases of mechanical and, in other cases, of infective causation. The cellular infiltration in these cases can be demonstrated to be particularly abundant in the papillae around the end-bulbs of Meissner (Fig. 18).

As an end-result, lichenification and kraurosis result in both these types.

The usual sequence of pathological events in these cases is, therefore, a condition of normal tissue or normal tissue plus the inciting lesion; secondly, a chronic productive dermatitis of traumatic origin, and in some cases an infective acute or subacute exudative dermatitis which may later in both cases progress to an atrophic dermal condition known as kraurosis.

The foregoing are the essential pathological findings, but it must be mentioned for the sake of completeness that within the pruritic zone there also may occur, in some cases, various associated pathological conditions, which, though not a part of the pathological process of the disease, may contribute some features to it or in some cases furnish an actual inciting agent. As such, may be mentioned condylomata, prolapsed hemorrhoids, fistulae, ulcers in the terminal portion of the anal canal or between the two sphincters, small sinuses burrowing from the anal pockets, and the presence in some cases of parasites, such as pediculi, scabies, pinworms or thread-worms and sometimes fungi.

#### BACTERIOLOGICAL FINDINGS

This chapter is not intended as a comprehensive consideration of the field of intestinal and cutaneous infection, though nothing less than this is involved in the discussion of the bacteriological findings in pruritus of the anus. That subject, however, is in itself so vast and vague that we must, in order to preserve our continuity of thought, refer the reader to the existing books on the subject, and content ourselves here with a more limited consideration. In the bibliography are

mentioned several books which deal with the matter in detail.

Leaving then the subject of general intestinal and cutaneous infection as one of too debatable a nature to be fully pursued in this work, we can state as our object in this chapter the consideration of the suggested theories of bacterial etiology of the condition under discussion, a review of the known facts in the case, and the report of our own observations and data. Let us measure these against the standard of established principles and facts of modern bacteriology.

It is, of course, readily apparent to anyone who is even briefly conversant with the bacteriology of the feces and the skin, that such a line of speculation and investigation is fraught with tremendous possibilities of error, not only in the procedure of experiments and the collection of data of observations, but likewise in the correlation of said data and the deduction of conclusions therefrom. The difficulty in the formulation of logical conclusions is increased by the vagueness of the material with which one works. The natural result of such a situation can readily be the performance of much well-intended but loose bacteriology with a voluminous supplement of loose thinking.

That bacterial invasion of the affected tissues does occur is quite demonstrable in some cases. The microscopical findings described on page 34 show an undoubted chronic exudative dermatitis of probable infective origin. Bacteria may be demonstrated in situ in the tissues in selected cases. But is such a bacterial agent the streptococcus fecalis? There is enough evidence on hand to justify an expression of doubt, at least. If then, this organism is not the exciting factor, what one or ones are? I believe the questions herein stated deserve a thorough methodical investigation.

As a preliminary to a consideration of this condition I deemed it necessary and wise to determine for myself without any predetermined views exactly what a rigid bacterial examination would show.

If we are to enter into a truly scientific research as to the bacteriology of the tissues of the pruritic zone, it appears logical to me to start with a full knowledge of what the normal bacterial inhabitants of this region are.

We are dealing with tissue which by virtue of its very position is constantly overspread with material that is eminently rich in bacterial constituents. The feces, and in females the urine also, contribute many such bacteria-laden materials, and it is well to bear in mind that the normal skin is always covered, even in cleanly individuals, with a minute film of organic matter within which certain bacterial forms normally reside.

Proceeding then to a consideration of the bacteriological potentialities of the integument, we note that the superficial layer of the skin, the stratum corneum, by virtue of its exposed position, is found to afford a resting place for many varieties of microorganisms. These vary much in occurrence and in species, and the matter of their respective pathogenicity is obviously a very broad one. Most of the organisms found are saprophytic and non-pathogenic. Some are pathogenic while others seem to be non-pathogenic under ordinary circumstances but capable of becoming pathogenic when extraordinary conditions prevail.

Thus Sequeira in his book, "Diseases of the Skin," states that by means of cultures many varieties of microorganisms have been shown to make the epidermis their habitat, but that the vast majority of these are not of a pathogenic nature. It is well to note that his experience has shown that the non-pathogenic bacteria occur chiefly in the flexures, such as the axilla and between the toes where warmth and moisture favors their growth.

According to Sabouraud, pathogenic organisms are met only as individual units upon the normal skin, but if the epidermis has been damaged in any way as by friction or injury, or by some other condition which lowers the natural resisting power of the corneus layer, the bacteria develop colonies and produce an inflammatory reaction.

At least one organism is constantly found on the skin, that is the staphylococcus epidermidis albus which may under certain conditions become pathogenic. The reasons why this organism is sometimes capable of exciting cutaneous reaction are unknown. "It will be remembered," says Sequeira, "that the colon bacillus, a normal denizen of the bowel under certain circumstances imperfectly known as yet, undergoes a similar change and induces an inflammatory process in the skin."

The microbes commonly causing cutaneous lesions, are in the great majority of cases staphylococci (staphylococci pyogenes and the staphylococci epidermidis albus) and, to a lesser proportion, streptococci. The former cause such conditions of dermal infection as furuncles, carbuncles, follicular impetigo, sycosis and various seborrheic eruptions. The inflammation they induce is generally of a distinctly localized nature. The streptococci found differ very much in their virulence, but those met with most frequently belong to the one variety, the streptococcus pyogenes or streptococcus of Fehleisen. The streptococcus invasion induces a very different type of inflammatory reaction in the skin. As is seen in erysipelas and various forms of phlegmonous inflammations where it is the causative agent, its tendency is toward a diffuse reaction rather than a distinctly localized affair as in the case of staphylococcic infection. Streptococci are commonly found in the cavity of the mouth, but they are by far less common on the normal skin than staphylococci.

MacLeod in his book on "Diseases of the Skin," in reference to the presence of bacteria on the normal skin, says that many attempts have been made to classify the different species of bacteria which may occur on the healthy stratum corneum and that complicated lists of them have been published; but that such compilations differ to such an extent in the number of the microorganisms included and in the type which is regarded as pathogenic that they are of comparatively little value and only serve to emphasize the difficulties of the subject. These difficulties are, in great part, due to the fact that it is almost impossible to draw a hard and fast line between bacteria that are slightly pathogenic and those that cause no apparent disturbance.

The majority of authors seem to agree that the average bacterial flora of the normal skin is a predominance of staphylococcic species: (1) *S. epidermidis albus* (Welch); (2) *S. cutis communis* (Sabouraud); (3) *S. pyogenes albus*; (4) *S. pyogenes aureus*, with a minority representation by various strains of streptococci, and the occasional presence of other organisms. In reference to the skin of the pruritic zone with which we are, of course, more especially concerned, my studies to be described in detail later on, show a pre-

ponderance of *B. coli* with a minority representation of staphylococci and saprophytic organisms.

Advancing now to a consideration of what the bacteriological possibilities are in the mucosa lining the anal canal, we come to an even more extensive and indeterminate situation. The knowledge which we have on this subject is at best but meager and inexact. Even those authorities such as Cammidge, who have made a special study of the bacterial flora of the feces, can give us but scant information of a definite character. The reason for this lies, of course, in the enormous numbers and the large variety of the microorganisms appearing in the stools. Herter in his book on "The Common Bacterial Infections of the Digestive Tract" states that the number of microorganisms in the normal daily human excreta has been estimated at 126 billions. Another author estimates that from 5 to 8 grams of bacteria are excreted in the daily feces of a normal man. Of course, by far the majority of these are dead, but the enormity of bacterial life in the feces can well be visualized upon consideration of these statements. Many different varieties and species have been demonstrated to exist in this mass of bacterial life. Cammidge in his "Feces of Children and Adults" states that the percentage relation of bacteria to total dry residue of the feces found by different observers may be summed up as follows:

Strasburger.....	24.3 per cent
Schittenhelm and Tollens.....	42.0 per cent
Lissauer.....	8.7 per cent
Tobaya.....	11.2 per cent
Sato.....	24.4 per cent
Berger and Tsuchiya.....	12.6 per cent
Harris.....	9.2 average per cent

As to the predominant species organisms in this multitudinous array the following authorities express themselves in the manner indicated.

Park and Williams in their "Pathogenic Microorganisms" (pp. 155-156) state that the *B. coli* group, (which includes the *B. alkaligenes* and *B. acidi lactici*), is the most frequent and the most important organism occurring in the feces while *B. coli* has the same status relative to occurrence in the urine.

Hiss and Zinsser in "A Textbook of Bacteriology," speaking in reference to the bacteriological examination of feces,

give as their opinion that by far the greater part of the intestinal flora consists of members of the colon group, bacilli of the lactis aërogenes group, *B. fecalis alkaligenes*, *B. mesentericus* and relatively smaller numbers of streptococci, staphylococci and Gram-positive anaerobes.

Herter, in his previously mentioned book, gives the following notes of the bacteriological findings in the rectum in a case of sudden death: "Colon bacillus—numerous as are also slender Gram-negative bacilli. There are moderate numbers of Gram-positive diplococci and diplobacilli. Organisms of the capsulatus type are fairly numerous."

Cammidge says that *B. coli* is preeminently the intestinal saprophyte in adults. It appears in the majority of cases to exert a beneficial or indifferent effect on the average adult. As to whether it can become pathogenic in the intestines authorities are uncertain, since it may be but an indirect factor in such a condition.

Obviously the consensus of opinion is that the predominant feature of the fecal bacteria is the preeminence of *B. coli*. As to the occurrence of the minor components of the picture I shall again refer to the authorities to whom I have previously alluded.

In reference to the occurrence of streptococci in the intestine Herter asserts that both the small and large intestines usually contain Gram-positive diplococci in moderate numbers. In culture media, he further says, these may grow freely in chains. Here it will be observed is a notable opportunity for the performance of the loose bacteriology mentioned in the earlier part of this chapter as a possibility. An additional fact that this same authority supplies, that is large quantities of the bouillon cultures of the Gram-positive diplococci of the normal intestine (which may have developed into chains on the bouillon media) may be injected into guinea-pigs either intraperitoneally or subcutaneously without giving rise to any symptoms or lesions. He concludes by saying that the normal human intestinal tract is probably most of the time free from pathological streptococci and in normal adults such pathological bacteria as are introduced with milk or water are ordinarily quickly destroyed in the upper tract.

Further variability is added to this subject by the well-established fact that diet effects a controlling influence

over the bacterial growth by restricting in some cases and furnishing in others the best nutritive and reactive conditions for certain types. Carbohydrates, particularly lactose and dextrin, are very prone to favor the predominance of fermentative flora of which *B. acidophilus* is the most notable representative. Proteins, on the other hand, particularly those of meats, increase the putrefactive flora. Vegetable proteins and those of milk have the same effect, but to a much less marked degree.

Cambridge is of the opinion that streptococci, diplococci, and staphylococci are normal inhabitants of the intestinal tract and are consequently met with in the feces. Houston examined a number of normal stools and found streptococci varying in numbers from a thousand to a million per gram, with numerous diplococci. He also mentions the fact that the normal Gram-positive diplococci of the intestine form chains in broth culture but are not pathogenic for guinea-pigs. This fact will be recognized as an important one, for it makes the finding of the streptococcus chains on the tissues inconclusive evidence of their pathogenicity.

Gordon and Andrews classified the commonest types of streptococci occurring in feces according to the power they possess of fermenting different carbohydrates. The sugars and substances they used in their tests were saccharose, lactose, raffinose, inulin, salicin, coniferrin, mannite, milk, neutral red. The reactions they noted were:

- S. longus*. . . . . ferments saccharose, lactose and salicin.
- S. brevis*. . . . . ferments saccharose, lactose and milk, and sometimes raffinose with acid production.
- S. fecalis*. . . . . ferments everything except raffinose and inulin and also forms acid.
- Pneumococcus*. ferments saccharose, lactose, raffinose and sometimes inulin and milk.

The reliability of such cultural tests has been put in a questionable light by Walker and others, who state that, on retesting various strains after cultivation through animals, the original reactions are materially changed. This has been my observation also and it must be borne in mind that such a classification is no indicator of pathogenicity.

Cambridge concludes in regard to these streptococci that for the present it may be concluded that while there

are variations in streptococci brought about by alterations in their surroundings, we have no reliable evidence that more than one species exists; hence, they do not furnish an absolute means of differentiating pathogenic from non-pathogenic varieties in fecal and similar examinations.

*The foregoing facts may be briefly reviewed as follows:*

1. The bacteria found upon the normal skin are a preponderance of staphylococcus species and a minority representation of streptococcus pyogenes.

2. The bacterial population of the normal intestinal tract is enormous and varied: its predominating organism is the *B. coli* and allied types; a weak minority representation is made by certain Gram-positive diplococci and other chiefly anaerobic coccoid forms. Various observers have noted that the above mentioned Gram-positive diplococci have a tendency to grow in chains when grown in a rich medium such as bouillon.

3. The pruritic zone, therefore, is liable to have on its surface representatives of both of the foregoing groups.

As regards the matter of experimental studies which have for their object the exact determination of the bacteriological features of the condition as it occurs clinically, such investigations have been limited to but a few men. Murray certainly deserves the distinction of having been the pioneer. His was the only work along these lines which was carried on over any great length of time, extending, as it did, from 1909 till 1920. Others, of course, have dabbled in the subject to their own satisfaction but no prolonged study has been attempted similar to Murray's. Regardless of his theory, the details of which are not in consonance with my own, Murray is to be commended for focusing proctological discussion on this hitherto neglected viewpoint. The only other author whom a survey of the literature shows has done this type of work is Winfield in 1921. His work is along the lines of Murray's though far less extensive. The researches of both these investigators, as well as my own, will be described more minutely later on.

A preliminary report of Murray's investigations was made in the *Transactions of the American Proctologic Society* for 1909. The report stated that "19 cases of typical clinical pruritus ani" had been examined by simple smear and cotton

swab in the first cases without any preliminary preparation of the area examined, but later cases were examined after swabbing with soap water and sterile water. He gives as his findings that "streptococci have been found externally on the skin in excessive numbers in every case." He also examined in a similar manner 5 cases having other rectal disease but no pruritus and "only one of these control cases showed any streptococci outside the anal canal and these were very few." From the foregoing, his data may be summarized by saying that he found what he considered streptococci externally on the skin in what he deemed excessive numbers in 19 cases with pruritus ani, and some streptococci in the same location in one case without pruritus ani and no streptococci in that area in 4 cases without pruritus ani. From these data he concluded that he had demonstrated streptococcic infection to exist in 19 cases with pruritus ani, since he states that "after 7 cases had shown positive streptococci infection" opsonic tests were made for streptococcus in comparison to those for other organisms, and he found "in every case tested that the resistance against streptococci was low and high for other organisms." His conclusion as to the presence of streptococcic infection is obviously drawn from incorrect and incomplete premises, and his statement concerning the opsonic index, which he offers as confirmatory, is even more so when we consider that this index, because of its extreme variability, has long since been discarded by clinicians and bacteriologists as an indicator of infection. His finding that the opsonic index is lower for streptococci than for other organisms is moreover the normal state in all human beings.

In his second series, reported in 1912, the bacteriological examination was never carried further than the broth growth. This is a point of importance inasmuch as there is normally present in the feces a Gram-positive diplococcus which grows into chains when planted in broth, and though it might be called a streptococcus on morphological grounds is non-pathogenic even when injected in large numbers into quinea-pigs. This observation has been made by many students of fecal flora. However, on the basis of the growths he obtained in these cases he further concludes that streptococci are in the superficial layers of the skin itself as well as on the

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## PRURITUS OF THE PERINEUM

surface. He offers no proof of this statement save the above-mentioned broth culture derived from swabbing the surface of the area under examination. This seems to me insufficient evidence to warrant such an important conclusion. The technique he describes in this report is that of scrubbing the external anal skin with liquid soap and water, then with sterile water, lightly drying the parts, after which the swab is rubbed over the pruritic skin. The swab is then placed in broth and the growth examined after twelve hours when, if "three or four cocci in chains" are seen, streptococci infection is presumed to exist. Subsequent reports are in conformity with the foregoing both as to methods and inferences drawn.

Murray, basing his conclusions on the rather meager findings just mentioned, gave as his opinion that he had demonstrated the presence of an infection by streptococcus fecalis in 100 per cent of his cases. All subsequent findings and conclusions, as expressed in his later writings, have the same quality of assurance, although in deference perhaps to a widespread lack of confirmation on the part of other members of the profession, he stated in his later writings that it was quite possible that a mixed infection with the colon bacillus might occur.

It is interesting to note the basis from which this author reasoned. This is set forth in a paper he presented to the American Proctologic Society at its 1911 meeting. Briefly, the paper may be stated as follows: He believed that he had obtained the best results in the treatment of the condition from those measures which had for its principal item the use of a strong germicide. "The routine treatment that I have used for a number of years is as follows: I then cauterized the anal skin with 95 per cent pure phenol (carbolic acid), etc."

Needless to say, the conclusion that the beneficent effect of the treatment was wholly due to the germicidal action of the carbolic acid applied, is founded on and drawn from incorrect premises. Great though the bactericidal action of 95 per cent carbolic acid is, such action is quite equaled by its local anesthetic action which in such strength must necessarily produce a fairly lasting action.

Murray further reasoned that "inasmuch as the appearance of the skin about the anus is almost identical in all cases of

pruritus ani, it follows that the same infection may be the cause in all cases." Such a deduction is clearly obtained from incomplete premises and cannot be accepted either as a proven or a logical statement. Inferring the bacterial content of a tissue by its macroscopic appearances is to my mind putting the idea of bacteriological diagnostics to too severe a test.

Inasmuch as the theory that the streptococcus fecalis causes pruritus of the anus has gained a certain amount of credence, it should be refuted, although I do not believe it merits refutation either by virtue of its method of formulation or of data offered in support.

The demonstration of bacteria "externally on the skin" does not justify the conclusion that such a condition is evidence of actual infection of the skin whereon they were found. Infection, as ordinarily defined by the standard authorities on bacteriological and immunological matters, implies the invasion of, and the subsistence and propagation in, tissues by bacteria. The mere presence on the skin of bacteria cannot be construed to mean that they are the causative factors of a process going on in the tissues beneath.

As to the specific organism which he designates as the causative agent, the streptococcus fecalis, not only my own studies, which have been careful and extensive, but the work of others has disproved its pathogenicity and its specific occurrence in this condition. The statement which he offers in support of his assertion as to the occurrence of streptococci, betrays a woeful lack of familiarity with the ordinary findings in bacteriological examinations of that region. A very frequent finding is that of Gram-positive cocci which grow into chains on artificial media (broth especially). They are normal inhabitants of this region, are non-pathogenic, and can (if colon growth be checked) be isolated from practically 85 per cent of normal anal mucous membranes. This fact raises a doubt in my mind as to whether he actually did find a true streptococcus or whether it was the above-mentioned Gram-positive diplococcus which when grown in a rich medium assumed a chain form. Even granting the finding of a true streptococcus, we cannot be certain that the streptococcus fecalis was the one found, for Murray and his pathologist speak of "the mannite fermenting type of

streptococci" as if only one such type existed. The established facts in the case are that there are no less than eight different strains of streptococci which ferment mannite. In view of the careless manner in which his cultures were taken it is also quite conceivable that some contamination with *B. coli*, which also ferments mannite, occurred.

The finding of a lower opsonic index for streptococcus than for other organisms does not warrant the conclusion that such a finding is confirmatory of the theory of streptococcic infection, for the reason that the opsonic index for streptococcus is normally lower than that for most other organisms, the reason being that the streptococcus is notably deficient in power to evoke immune reactions in the human body. Moreover, the phenomenon of opsonic index is not regarded at the present time by authoritative bacteriologists as having any clinical value whatsoever in the diagnosis of infection. I must, therefore, conclude in regard to Murray's studies that neither the methods used, the data obtained, nor the conclusions drawn were correct.

More recently J. M. Winfield (*Arch. Derm. and Syph.*, Nov. 21, 1921, iv, 680) presents a review of a series of 50 cases. In this he finds that 80 per cent "had an infection of the skin covering the affected parts caused either by the colon bacillus or the streptococcus fecalis or by both together. In 100 per cent of these infected cases the colon bacillus was obtained from the exudate," and in 75 per cent the streptococcus fecalis was demonstrated. Autogenous or stock vaccines are reputed by this author to have cured all these cases. The same author reports 8 cases in which the epidermophyton fungus was a cause.

In other words, Winfield gives as his findings: *B. coli* infection in 80 per cent of all cases of pruritus ani with the further finding of a mixed infection by streptococcus fecalis in many and by epidermophyton fungus in others. Such a statement regarding the demonstration of infection lays Winfield open to the same criticism I made of Murray, namely, that no such infection can be assumed on the basis of the proof offered. While I am reasonably sure, because of my pathological studies of the tissue in this region, that infection does occur, in a certain percentage of cases, yet my own researches do not support such a statement nor does

clinical experience warrant classifying four-fifths of all cases as infective. With the present elevation to public interest of the *B. acidophilus*, it can be safely predicted that this, too, will be shortly found as the cause of infection in nearly 100 per cent of the cases. Or, perhaps, if not *B. acidophilus*, then some bacterium normally present on the normal anal mucosa, which can when guided by desire and suitable

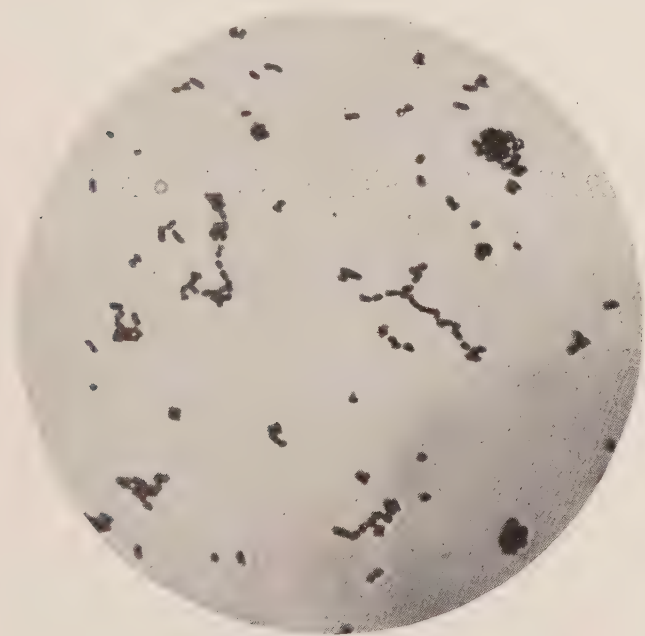


FIG. 19. CASE XXII. *Clinical Diagnosis:* Pruritus ani (direct pruritus). Subculture shows gram-positive diplococcus known as *streptococcus fecalis*.

media be grown in 100 per cent of all cases. The fact that the colon bacillus and a strain of non-pathogenic chain-growing diplococci are normal residents of the area under investigation, did not seem to enter the consideration of either Murray or Winfield nor influence their judgment as to pathogenicity.

With the idea, however, of ascertaining to what extent the findings of Murray and of Winfield could be corroborated, I initiated in 1918 and later in 1921 and 1922 a series of bacteriological examinations along similar lines. The technique described in detail below was made to conform with

Murray's, the only modification being a more serious attempt to avoid contamination during the taking of the culture and a more detailed analysis of the cultures obtained.

The cases subjected to this examination were in all 20 of rectal diseases, in which pruritus of the anus was absent, and 14 cases, in which it was present without other anorectal pathology. In addition five normal people were examined

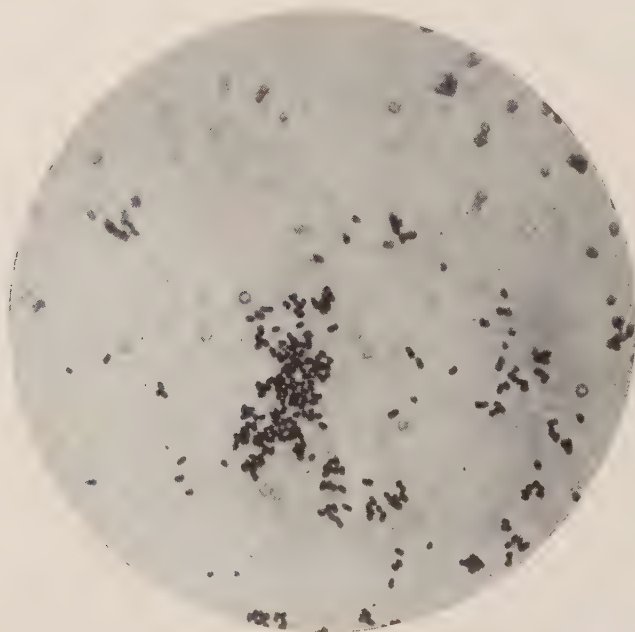


FIG. 20. CASE XXII. *Clinical Diagnosis:* Pruritus ani (direct pruritus).  
*Culture shows staphylococcus albus.*

simultaneously with each group in order to control the observations. The diet in each instance was made as uniform as was possible with so many individual tastes to be considered. Full diet with meat was allowed.

In each case a culture was taken from three different regions of the posterior sector. These regions were the posterior wall of the anal canal, the posterior portion of the mucocutaneous margin, and the posterior sector of the perianal region. The posterior sector was chosen because that is in many cases the seat of the most intense clinical manifesta-

tions. In all, 132 original cultures were taken for study. As an example of the manner in which each was studied is shown, the reader is referred to Chart I, and also to Figures 19, 20 and 21.

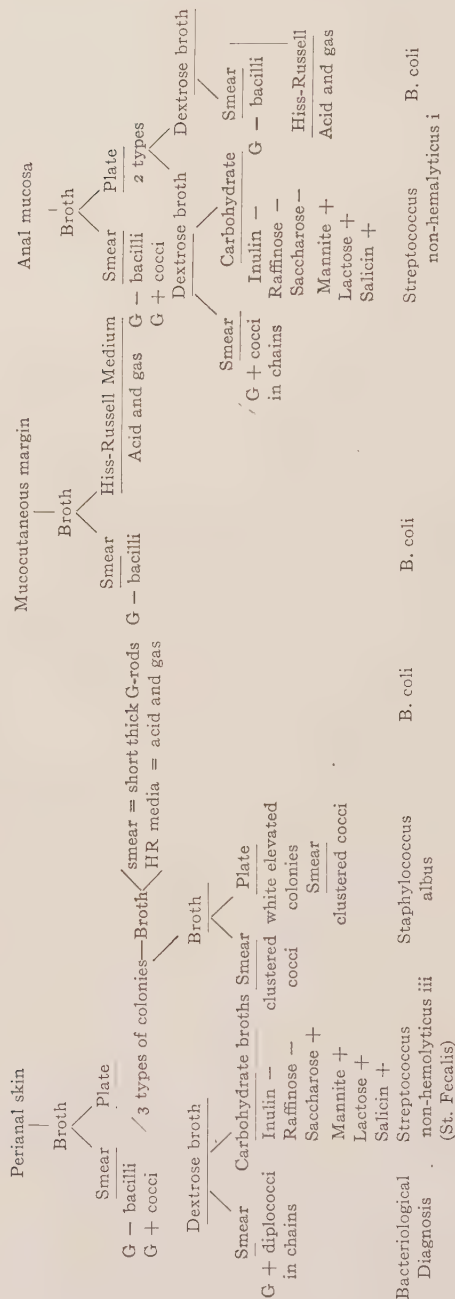
The area was exposed by inserting a large-sized sterile Brinkerhoff speculum with the slide posterior. Upon removing the slide the area was swabbed thoroughly with sterile liquid soap and then irrigated with sterile water. The culture



FIG. 21. CASE XXII. *Clinical Diagnosis: Pruritus ani (direct pruritus).*  
Culture shows bacillus coli.

was then obtained by thoroughly rubbing the regions indicated with sterile cotton swabs. The three swabs were then placed as obtained in separate tubes of sterile meat infusion of moderate alkalinity (.2 to .5 per cent alkaline to phenolphthalein). Incubation at  $37.5^{\circ}$  C. was allowed to proceed from twelve to eighteen hours. At the end of this time a smear was made and stained by Gram's method. The culture was then plated out on dextrose agar. From the colony growths thus obtained one each of different types

CHART I  
CLINICAL DIAGNOSIS-PRURITUS ANI (DIRECT PRURITUS OF THE ANUS)\*



\* Case xxii, Figs. 19, 20 and 21.

was fished out and planted on broth. From these last cultures smears were again taken and if bacilli were found a Hiss-Russell stab was made, whereas if cocci were found the following carbohydrate serum tubes were inoculated: inulin, raffinose, saccharose, mannite, lactose, maltose and salicin.

An elaborate tabulation might be made of this work, but the observations noted were of such a simple type that extensive tabulation would tend to confuse rather than elucidate. Therefore, instead of tabulating each case I will present my findings bluntly in an epitomized manner (Chart II). Any impartial bacteriologist will have no difficulty in confirming them.

It will be noted from the data submitted above that the bacterial species found were essentially identical in each of the three groups, and that the presence or absence of pruritus of the anus apparently bore no relation to the bacterial findings. Whatever variation was noted was of such an unimportant nature as to be negligible, as, for instance, the finding of *B. coli communior* in three instances, certain differences in the occurrence of the minor components, as, for example, *B. lactis aërogenes*, etc. Although it is true that the Gram-positive diplococcus does assume a chain-like form when grown in dextrose broth, this fact does not seem to me to be of importance inasmuch as many other bacteria will assume this form under the optimum conditions of rich media and proper temperature. It is probably the result of rapid division and subdivision of the bacteria proceeding without disturbance. Although some bacteriologists classify this organism as a streptococcus because of its tendency to occasional short chain formation I prefer to refer to it according to its more usual formation namely as a Gram-positive diplococcus for the reason that the term "streptococcus" seems to imply pathogenic characteristics which this organism does not possess. The particular organism in question, moreover, shows its component diplococci very markedly even when chain form is assumed. For instance, contrast the microorganisms in Figure 19, derived from a culture in these cases, with that of Figure 22 taken from a case of streptococcus infection of the bladder. The latter is a small coccus strictly spherical and united not in pairs

CHART II  
REGIONAL BACTERIOLOGICAL FINDINGS IN RELATION TO THE PRESENCE OF PRURITUS

	Anal canal	Mucocutaneous line	Perianal skin
Ten normal persons.....	<i>B. coli communis</i> ..... 9 Gram-positive diplococci..... 7 <i>B. fecalis</i> alkaligenes..... 3 <i>B. lactis</i> aërogenes..... 2 <i>B. coli communior</i> ..... 1 <i>Anaerobes</i> ..... 1	<i>B. coli communis</i> ..... 9 Gram-positive diplococci..... 6 <i>B. lactis</i> aërogenes..... 2 <i>B. fecalis</i> alkaligenes..... 1 <i>B. coli communior</i> ..... 1	<i>B. coli communis</i> ..... 5 Gram-positive diplococci..... 4 <i>B. subtilis</i> ..... 1 <i>Staphylococcus epidermidis</i> ..... 1
Twenty with rectal disease without pruritus.	<i>B. coli communis</i> ..... 19 Gram-positive diplococci..... 15 <i>B. lactis</i> aërogenes..... 7 <i>B. fecalis</i> alkaligenes..... 4 <i>Anaerobes</i> ..... 1	<i>B. coli communis</i> ..... 15 Gram-positive diplococci..... 11 <i>B. lactis</i> aërogenes..... 6	<i>B. coli communis</i> ..... 11 Gram-positive diplococci..... 7 <i>Staphylococcus albus</i> ..... 2 <i>Staphylococcus epidermidis</i> ..... 1 <i>B. subtilis</i> ..... 2
Fourteen without anorectal disease other than pruritus of the anus.....	<i>B. coli communis</i> ..... 13 Gram-positive diplococci..... 12 <i>B. fecalis</i> alkaligenes..... 2 <i>B. lactis</i> aërogenes..... 1	<i>B. coli communis</i> ..... 13 Gram-positive diplococci..... 7 <i>B. lactis</i> aërogenes..... 3	<i>B. coli communis</i> ..... 7 Gram-positive diplococci..... 1 <i>Staphylococcus albus</i> ..... 1
Summary.....	<i>B. coli communis</i> ..... 41 Gram-positive diplococci..... 34 <i>B. coli communior</i> ..... 2 <i>B. lactis</i> aërogenes..... 10 Miscellaneous..... 11	<i>B. coli communis</i> ..... 37 Gram-positive diplococci..... 24 <i>B. lactis</i> aërogenes..... 11 Miscellaneous..... 1	<i>B. coli communis</i> ..... 23 Gram-positive diplococci..... 18 <i>Staphylococcus albus</i> ..... 3 <i>B. subtilis</i> ..... 3 <i>Staphylococcus epidermidis</i> ..... 2
Forty-four examined.....			
Number of original cultures taken.....			132
Number of growths obtained from such cultures.....			118
Failed to obtain growths of any kind in.....			14

but into definite long chains. Even if we grant that it is a streptococcus by virtue of its tendency to grow in chains in bouillon, it most assuredly does not simulate the true streptococcus pyogenes in any other way. To confirm the observations of other bacteriologists, and for my own satisfaction, I have injected pure cultures of this organism in enormous doses into the peritoneal cavity of guinea-

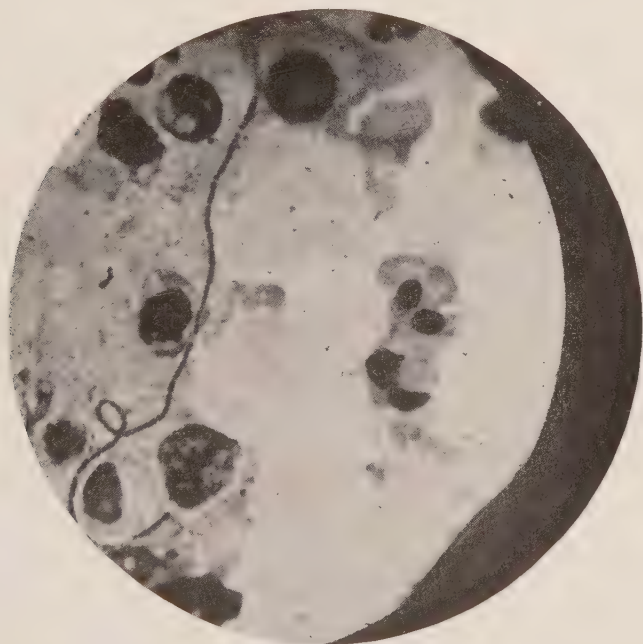


FIG. 22. Streptococcus chain in tissue derived from a true streptococcus infection. Note the dissimilarity morphologically between the organisms shown in Fig. 19 and this.

pigs and into the subcutaneous tissues of dogs without the slightest reaction or infection. Knowing that this organism is the one that has been indicated as the specific causative agent, I determined to try to produce the disease of pruritus ani with it. However, as Park in his "Pathogenic Microorganisms," admirably states there is a distinction between an injection disease and an infection disease. In other words, the production of bacterial invasion by means of hypodermic injection often does not give one a true picture

of the infective power of a bacterium. To meet this point, which I consider very well taken, I made several small collodion sacs and placed therein pure cultures of the organism. Such collodion sacs, while not permeable to the extent of leaking, will allow dialysis to occur by the process of osmosis. I, therefore, concluded that if placed in the anal canal, sufficient of the culture would dialyze through to make the sac function very well as an artificial focus of infection to the neighboring tissue.

In this manner sacs containing pure cultures of the organisms in question were tried out. As a control, sacs of Ringer's solution (sterile) were used. Each sac was kept in situ for twenty-four hours, being replaced after defecation. While in place irritation, at times itching occurred in all cases due, no doubt, to the resilient quality of the collodion. The intensity of irritation seemed about equal in all cases. After withdrawal, however, all cases promptly regained a normal state of sensation in the region. (They were all normal cases.) When the perianal skin in the zone was deliberately scratched in one half the cases and the experiment repeated, a definite pruritus remained after the removal of the sacs in several instances—one a *B. coli* and two, staphylococcus. One of the latter was so intense that I was compelled to give a full Sabouraud pastille dose of roentgen ray to eradicate the condition. The Gram-positive diplococcus showed no power to invade, although a culture made from the sacs after the experiment proved its viability. In conclusion, the fallacy of a streptococcus being a factor of infection in this disease lies in the fact that such observation is based on morphological findings and not on biological ones. The issue is not what these organisms look like; it is what have they the power to do.

While the foregoing studies were in progress I gradually came to the conclusion that if we are to avoid making a scientific farce out of so important a subject, the bacteriological investigator must conduct his investigation not only along the lines of sound bacteriological practice, but also with a thorough understanding of the underlying principles of infection and immunology.

No well-trained bacteriologist would seriously consider the results of a bacteriological examination unless he were cer-

tain that the material under investigation had been collected under such conditions and by such methods as would preclude its contamination. For instance, taking a culture of the anal mucosa or perianal skin with a non-sterile cotton swab without preliminary preparation of the area, obviously renders the results valueless because we cannot rule out contaminating organisms. These were the conditions under which Murray's first experiments were performed. Nor does the preliminary scrubbing with soap and rinsing with sterile water, which method he used later and I used in my studies just described, entirely preclude the possibility of contamination, for the reason that such casual cleansing cannot be thorough to the extent of removing all organisms lodged in the folds on the surface of the anal mucosa or perianal skin. This I concluded from my series, in which after cleansing the region in a manner that I deemed thorough, I still obtained a growth in 118 of the 132 cultures attempted. Had I successfully cleansed the area I should have had no growth whatever in any case.

To eliminate this element of obvious error I devised the following method which was apparently successful.

Since the term infection presumes the invasion of tissues by bacteria I next attempted the culture from said tissues of whatever organism might be present in the pruritic area. Recognizing the difficulties of this in view of my previous findings as to the bacteria on the surface of such tissue, I devised the following technique. After thoroughly washing the pruritic area with sterile soap, under complete aseptic technique, and with sterile instruments, I removed a small section of tissue from this area and dropped it into a tube of sterile broth. The cotton plug was flamed and also the mouth of the test-tube. The tube was then placed in an incubator where it was kept at a  $37.5^{\circ}$  C. for twelve hours. At the end of this time the specimen was removed by means of a sterile forceps, rinsed in sterile water, and dropped into another sterile tube, containing 5 per cent aqueous carbolic solution. Here it was allowed to remain for five minutes. Such treatment is considered by bacteriologists as sufficient to kill all living bacteria within reach of the fluid. I then removed this piece of tissue, and after rinsing it thoroughly with sterile water to remove all traces of carbolic solution, and under

continued aseptic measures, I cut it into four pieces each of which was placed into a tube of sterile broth and all were incubated in the same manner as the original specimen. The only difference in the technique was that it was incubated for a longer time, twenty-four hours being allowed.

The rationale of this technique is as follows: By my first step I attempted to obtain a culture of organisms still lodged on the surface. By exposing the tissue to carbolic solution I aimed at the destruction of such surface organisms as existed after culturing. Then working under the assumption that I had destroyed all bacterial life on the exterior of my specimen I laid its interior open with the object of obtaining a culture from that part of the specimen.

I did this with eleven individual specimens. My results were as follows:

1. From cultures obtained by the first step in the above outlined procedure I obtained seven growths out of the eleven taken and all seven showed bacteria of the *B. coli* group. Six of these were of the *communis* species and one was *B. coli* *communior*. Four of the seven also showed a growth of a Gram-positive diplococcus. One also showed a growth of staphylococcus.

2. From cultures obtained by the second step in my procedure I only obtained three growths out of the eleven taken. All three showed only one organism, *B. coli* *communis*. Only one of these three had shown a surface growth by the first culture.

In checking over this series of cases I stumbled upon a fact which has since proven of clinical importance to me in the treatment of these cases. All three cases which showed a growth in the second step, that is from the interior of the specimen of skin, presented clinically, excoriated areas in the perianal zone, while the other cases apparently did not. It seemed to me, therefore, that this break in the natural barrier had permitted, or made easy, the bacterial invasion my results seemed to indicate. To ascertain this I next ran a series of two groups of cases, the one with, and the other without, the presence of excoriations, abrasions, or other visible injury to the skin in the perianal region. These I ran through the same process as the trial specimens just described. The results confirmed my suspicion. *B. coli* was cultured

from the former in over half the cases, while no organism was derived from any of the latter class. Here I then reasoned, we have strong presumptive evidence of bacterial invasion occurring in cases which clinically present evidence of epidermal injury. To demonstrate this beyond the peradventure of a doubt, and, moreover, to confirm the nature, if possible, of such infection, I next attempted to demonstrate the bacteria *in situ* in the tissues.

As is commonly known, the demonstration of microorganisms in the tissues is at best a difficult task. Even in tissues or purulent exudate known to contain bacteria, it is surprising to see how few may be found in any given field. In addition to this difficulty arising from the low numbers to be found in any particular area, there is the further complication that the protoplasm of bacteria responds to staining reagents in a closely similar manner to the nuclear chromatin of the tissue cells. Thus we are burdened with the possibility of an honest error in differentiating nuclei from microorganisms. Not only nuclei but also precipitated stain, chromatin granules, dirt on the slide or cover glass, and various mitotic figures must be distinguished before we are certain that an object we discover is really organic in nature. In the skin the presence of normal pigment granules is an additional fact to be borne in mind. All these difficulties are experienced when searching for bacteria, particularly for Gram-positive organisms. When it comes to Gram-negative bacteria the Gram differentiation method is rendered useless because of the fact that the tissue cells themselves (exclusive of the nuclei) also stain Gram-negative. Inasmuch as one of the organisms under suspicion is the Gram-negative bacillus *B. coli*, the reality of these difficulties becomes especially apparent.

In obtaining the specimen to be subjected to this sort of an investigation, great care must be taken and it should be done with as little handling as possible. The use of mouse-tooth forceps is to be avoided, as the specimen is torn by this instrument. A hemostat, on the other hand, crushes so as to render structure imperfect. The ordinary biopsy punch is not very well adapted for use in this region. The best results are obtainable from the use of an Allis clamp or anatomical forceps lightly held. Small pieces are preferable to large ones,

for the reason that although more difficult to work with they allow better permeation of the fixing, hardening and staining reagents.

The early fixation of the specimen is desirable so that post-mortem changes may be reduced to a minimum. Although many fixatives are available, the most satisfactory in my hands has been Zenker's fluid and 80 per cent alcohol. The use of absolute alcohol impairs the finer structure of the tissue, which it is of course desirable to preserve in a study of this kind. Corrosive sublimate has a tendency to make the tissue brittle and to precipitate in minute quantities in the tissues, thus leading to undesirable confusion with micro-organisms. The small amount of this substance in Zenker's fluid does not, however, appear to exert such an action. I have used formalin (5 to 10 per cent) with fair results.

In brief the method which has been followed in my studies is as follows:

1. Fix in Zenker's fluid for twelve hours.
2. Wash in running water for twenty-four hours.
3. Ninety-five per cent alcohol for twenty-four hours.
4. Absolute alcohol for twenty-four hours.
5. Acetone for two hours.
6. Xylol till clear.
7. Imbed.

Imbedding may be done in celloidin or in paraffin. The latter is by far the most preferable for this work, for the reason that celloidin itself takes the stain to a certain degree and makes the distinguishing of bacteria unduly difficult. To imbed in paraffin we place the specimen in two successive baths at a temperature of 56° C. for two hours each. The imbedded specimen is then mounted on a sectioning block and chilled. Sections are cut on the following day. These are best cut three to six microns thick.

The staining of these sections is most conveniently done with the sections attached to the slide. This may be accomplished by covering the slide with a very thin layer of a filtered mixture of equal parts of egg albumin and glycerin to which a small crystal of camphor has been added. The sections are then floated upon a slide so prepared and set away in the thermostat for four to five hours. After this they may be stained.

As to the stains I used in this series: in an endeavor to demonstrate organisms in the tissue, particularly the *B. coli* which I felt certain I should find, I used over twenty-two different staining methods or modifications. Of these the best results were obtained from Nicolle's modification of Loeffler's method, Hiss and Zinsser's modification of Gram's method and McCallum's modification of Goodpasture's method. The technique of these methods is as follows:

*Nicolle's Modification of Loeffler's Method*

1. Alcoholic methylene blue, five to fifteen minutes or Loeffler's methylene blue, one to twenty-four hours.
2. Wash in 1-1000 acetic acid.
3. Wash in 10 per cent tannic acid for a few seconds.
4. Pour absolute alcohol over the section for from ten to twenty seconds.
5. Xylol till clear.
6. Mount in balsam.

When using this method I have found it advisable to counterstain with eosin.

*Hiss and Zinsser's Modification of Gram's Method*

1. Anilin-water gentian violet for from five to ten minutes.
2. Wash in water.
3. Cover with Gram's iodine solution for one minute.
4. Wash in water.
5. Absolute alcohol till no more color leaves.
6. Xylol till clear.
7. Mount in balsam.

*McCallum's Modification of Goodpasture's Method*

1. Goodpasture's stain for from ten minutes to one-half hour.

Goodpasture's stain: 30 per cent alcohol.....	100. c.c.
Basic fuchsin.....	0.59 gm.
Aniline oil.....	1. c.c.
Phenol crystals.....	1. c.c.

2. Wash in water.
3. Differentiate in 40 per cent (pure) formalin. This requires only a few seconds. The bright red color washes away and gives place to a clear rose color.
4. Wash in water.
5. Counterstain in saturated picric acid. The section should remain three to five minutes until it assumes a purplish color.
6. Wash in water.
7. Differentiate in 95 per cent alcohol. The red color reappears and some of it is washed out. Some of the yellow of the picric acid is also washed out.
8. Wash in water.
9. Stain in Stirling's gentian violet five minutes or more.
10. Wash in water.
11. Gram's iodine solution for one minute.

12. Blot dry without washing.
13. Anilin oil and xylol, equal parts, until no more of the color comes away.
14. Two changes of xylol.
15. Mount in balsam.

This stain shows Gram-negative organisms red; Gram-positive organisms blue; and the tissues brilliant shades of red and purple.

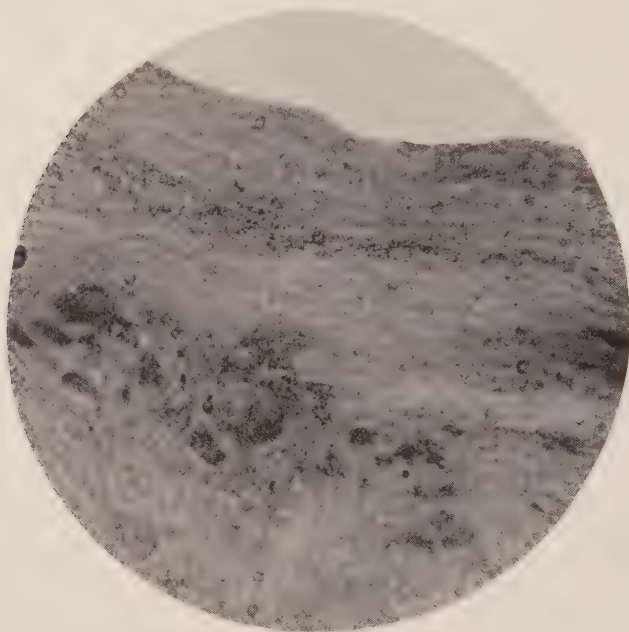
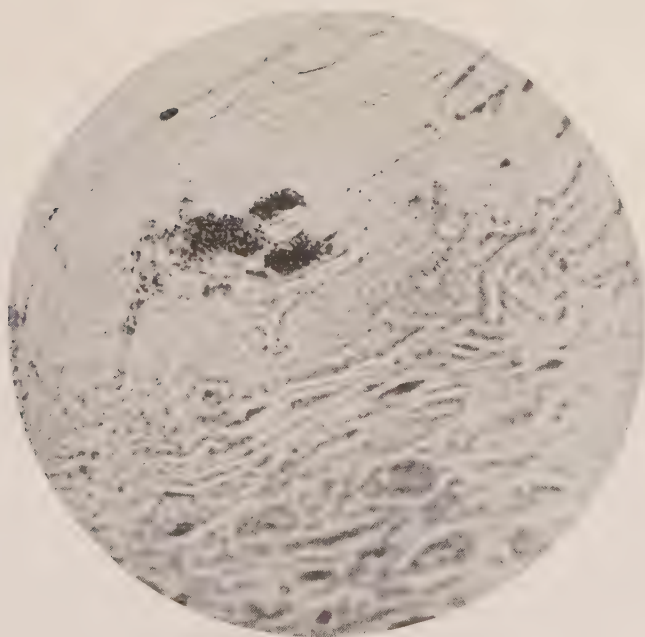
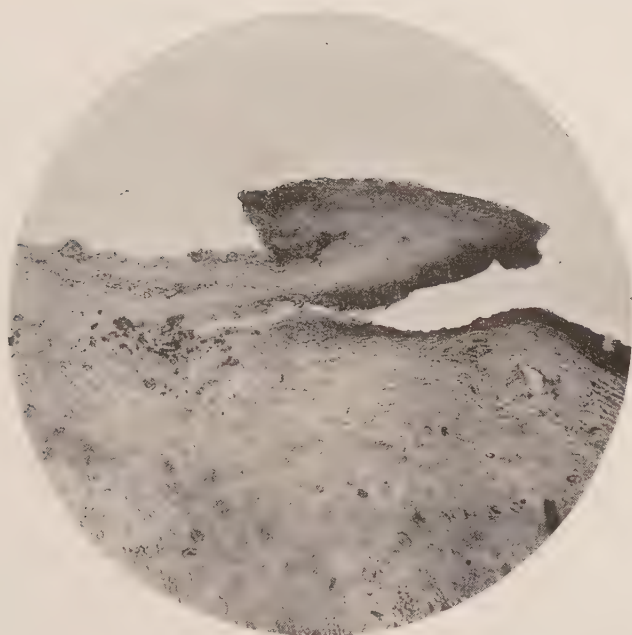


FIG. 23. Section of skin in pruritic area showing clumps of bacteria in the superficial layers of the epidermis. They are stained light blue and do not photograph well though they are distinct under the microscope. (McCallum modification of Goodpasture-Weigert stain.)

Despite great care in the selection of cases, the obtainance of specimens and in the staining, bacteria were found in only 74 out of some 1,700 sections examined. This of course must not be construed as being indicative of the absence of bacteria in all but the 74 cases. All that it can logically be assumed to signify is the success of the staining methods used in these instances. The bacteria may or may not have been present in the others, but since utmost care and painfully persistent search failed to reveal their presence, I



FIGS. 24 and 24A. Bacteria in the epidermal tissue in case of pruritus ani. Note superficiality of bacterial invasion and nearness to break in the stratum corneum. Organism is staphylococcus albus according to cultures on this same case.

feel safe in claiming that they were probably not there. Figures 23, 24 and 25 show sections in which I have been able to demonstrate their presence. They are to be seen in the superficial layers of the epidermis immediately subjacent to a crevice in the surface. Unfortunately, they are stained light blue and although perfectly distinct to the eye they do not photograph well. Under the microscope this specimen shows perfect clumps of staphylococci. In

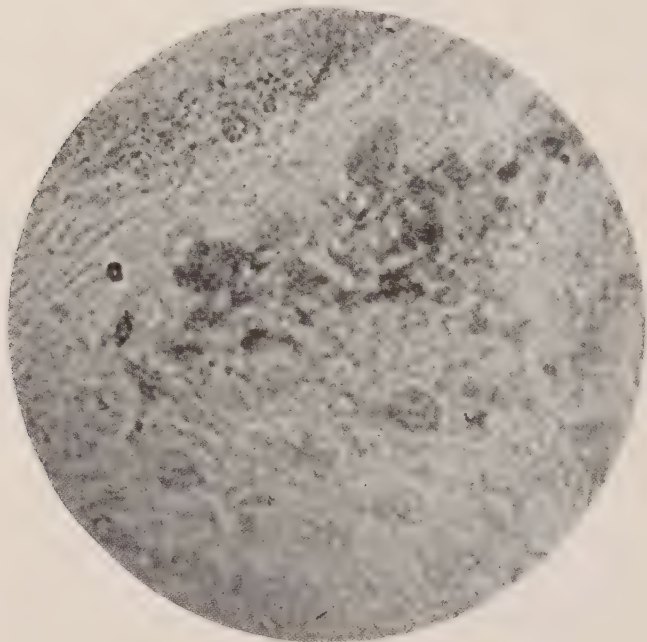


FIG. 25. Clumps of staphylococcus in the epidermal tissues in case of pruritus ani. Stain thionin-blue.  $\times 2500$ .

all the specimens showing organisms present, said organism was, morphologically, a staphylococcus, and this was substantiated on culture in each case. In no case did their invasion appear to reach further than halfway to the basement membrane of the epidermis. Likewise, in each case there was an evident break in the surface epidermis or a distinct cytolysis of the superficial layers. There was not a single instance in which *B. coli* or the streptococcus fecalis was demonstrated in the tissues.

The conclusion naturally follows that where the epidermis is injured by traumatism or maceration an invasion of bacteria may occur. This invasion in the cases studied is moderate and limited, due either to the resistance of the epidermal cells or to the low virulence of the invading organism.

Since invasion of the tissues has been accomplished by the organism, it fulfils the first postulate of infection. Its growth in clumps indicates its subsistence there. So that, in truth, we have here an infection surmised and proven. As previously mentioned, the bacterium found was the staphylococcus. I trust the reader will recall the proportion of cases in which it was found and thus avoid the error of thinking that every case is due to infection. I firmly believe that more cases are due to infection than my findings prove, but I am just as firmly convinced that the percentage is much lower than is commonly supposed.

It must be apparent to anyone who has carefully read the foregoing, that the idea of the causative agent of whatever infective condition we have proven to exist being streptococcal is decidedly beyond the pale of logical probability. I consider the occurrence of infection as probable, but the evidence on hand favors a different etiology than that of a streptococcus. On the basis of experimental results mentioned on page 62 I feel certain that both staphylococci and *B. coli* can be justly regarded as the probable infective agents in some cases. The observations contained in this chapter suggest a very plausible relation between demonstrable infection and visible clinical lesions or alteration in the affected area. It is recommended that this fact be borne in mind in the treatment of cases presenting such lesions. Whether such infection be primary or secondary is debatable, but the need of considering this factor when it comes to treatment is very evident.

#### CLINICAL PATHOLOGICAL FINDINGS

The clinical pathological findings in pruritus of the anus are of importance only in so far as they are indicative of pathological conditions elsewhere than in the pruritic zone. Although it has long been held that the pruritus associated with diabetes mellitus was due to the drying of the sugar-

laden urine on the skin, it must be obvious that such a contention is untenable in view of the experiments of Veit, who kept the parts constantly covered with a pad saturated with urine of a diabetic nature without causing pruritus, and this despite the fact that said experiment extended over a period of weeks.

Routine examination of the urine reveals nothing of particular importance. Leo, in an article "Ueber Sauerbehandlung des Pruritus" (*Therapeutische Monatshefte*, 1902, xvi, 612), states that the urine is strongly alkaline and contains an abnormally large amount of earthy phosphates. Another author claims that an increase of urates may be noted. My own observations on this point show no such preponderance either of alkalinity or acidity. Neither do phosphates nor urates appear consistently in excess. Sugar does, of course, appear in cases of diabetes mellitus, but it bears no relation to the intensity or even the occurrence of the pruritus. Albumin in the urine is naturally demonstrable in cases of pruritus which have a coincident nephritis, but I fail to find anything but a casual relationship between the existence of pruritus and the presence of albumin in the urine. I wish to draw attention however to the fact that both glycosuria and albuminuria indicate, in the majority of cases, a visceral disease: in the first instance, of the pancreas and, in the second instance, of the kidneys, and *this fact is important*. It will be well to bear this in mind when in a later chapter we discuss the etiology and pathogenesis of pruritus of the anus.

As to the findings in blood examination not much can be said. Patients do not agree readily to such tests. From clinical observations on the cases I have seen, anemia certainly does not appear to be a constant or even a common occurrence. It really seems quite the contrary, for many of the victims of this affection are actually otherwise robust. That an excess of some chemical constituent of the blood should bear a causative relation to such a localized irritation as pruritus is the evidence of, does not appear at all logical to suppose. If an increase of sugar or carbon dioxide in the blood had the power to induce a pruritus, it naturally would give rise to generalized pruritus and not to a strictly localized condition such as pruritus of the anus.

No particular quality of the stools is characteristic of this malady, but their character and composition at times can give a clue as to the existence of some pathological condition higher up in the gastrointestinal tract which does bear a relation to the pruritus. This is more fully discussed under the chapter on "Differential Diagnosis of the Etiological Factor" on page 91. One fact worth mentioning, however, is that hard stools, either by inducing straining or by actually fissuring the mucocutaneous margin, appear to be a frequent finding which bears a definite relation to the occurrence of pruritus.

### CHAPTER III

## ETIOLOGY AND PATHOGENESIS

In regard to the pathogenesis of the condition known as pruritus ani, I am strongly of the opinion that there exists enough material evidence in the nature of clinical observations, physiological data and pathological findings to make possible the submission of this problem to the rational process of logic with the aim of obtaining a definite and accurate comprehension of its nature.

To present here a list of all the causes to which pruritus ani is attributable, as stated in the literature upon the subject, would be a laborious procedure and one which would place the entire subject of the etiology of pruritus ani in a ludicrous light. I have been able to collect a list of 89 such causes from the literature.

It would, therefore, appear to be more logical to generalize upon this phase of the subject. If, instead of considering all these highly detailed causes as real causes, we consider them in the light of observations of conditions associated with pruritus ani, excellent use can be made of them. Certainly no one cause given in such an exaggerated list explains all cases of pruritus ani; and it is only natural to expect that if a cause be given as a serious effort to explain the pathogenesis of pruritus ani, it must be of such breadth and depth as to include each and every case of the condition under consideration.

Hence, in our search for fundamentals, we must disregard or assign a new significance to such special and detailed associated conditions. Assuredly, there is some basic factor at work, and an analysis of material evidence on hand coupled with experimentation must give the answer.

Disregarding for a moment the question as to whether we are dealing with a disease *per se* or a symptom among others, it will be agreed that the pruritic sensation, is the

preeminent and primary feature of the condition appearing, as it often does, long before any gross or microscopical changes occur in the tissues of the affected region. But are we dealing with a true perception of sensation arising from actual causes or with a product of purely psychic fabric? Do these patients think they are experiencing an irritating sensation called itching or are they in reality experiencing the sensation of which they complain? The vagaries of subjective symptoms are well known, but no one who has ever seen the physical suffering to which these people will subject themselves in their efforts to relieve the sensation; or the extent of excoriated surface in the perianal region resulting from their efforts to relieve by scratching; will doubt the truthfulness of their complaint. A true sensation, psychologists tell us, is prone to appear vivid, lively and present, whereas things thought of or imagined are relatively faint and devoid of the pungency or the quality of real presence which objects of sensation possess. In this respect the pruritus of pruritus ani conforms most decidedly to the standard. The victims of this condition are both consistent and logical in their complaints.

The absence of an apparent cause in not a few cases and the lack of a primary, local pathology in the gross and even, in the microscopical structure of many cases, naturally clouds with suspicion the reality of the condition. This, however, can be and will be most satisfactorily explained.

The absence of pruritus ani in any great proportion among the insane is noteworthy, and the rareness with which it is associated with hysteria or other recognized neuroses speaks very emphatically against the psychic theory in the matter of causation. This might be partially accounted for by considering such conditions as being another manifestation of the basic factors underlying pruritus. In other words, they are other modes of manifestation of similar causes.

Admitting then that the condition represents a true sensation and is not merely an hallucination, we find upon inspection and observation that it is referred in consciousness to a rather definite area which conforms not so much to the distribution of special peripheral nerves, but to the distribution of branches of the dorsal roots.

This area, to which the conscious mind attaches the sensation of pruritus, comprises the terminal inch of the anal canal, the mucocutaneous margin, and an elliptical area  $2\frac{3}{4}$  inches anteriorly and posteriorly from the center of the anal orifice and 2 inches laterally on both sides from the same point. This then is the area that shows clinical manifestations of the pruritus characterizing this condition, and for the sake of convenience this entire area will be referred to hereafter as the pruritic zone. It can with equal accuracy be made to include that area affected by pruritus vulvae and scroti. *The etiology and pathogenesis of pruritus of the perineum or any area in this region is identical with that which is described here with special reference to pruritus ani.*

This area is supplied by branches of the dorsal nerve roots from the first to the fourth sacral segments and in the case of the anococcygeal nerve from the first coccygeal segment. We have then a sensation of irritation projected in consciousness to the pruritic zone, an area supplied by the first, second, third and fourth sacral segments. If we then admit, as we must in view of the invalidity of the psychic theory, that it is the conscious appreciation of an irritation, we must find the source of such stimulation and consequent irritation. Needless to say, the territory which we must survey extends over the entire area of the nervous system. Knowing according to Mueller's "Law of the Specific Energy of the Senses" that "no kind of sensation can be produced by external causes which cannot be equally excited in the absence of external causes by intrinsic changes in our nerves," we must look with a critical eye not only upon the perceptual apparatus of the nervous system by means of which changes in the external world are translated from stimuli into appropriate nerve impulses, but we must also scan the conducting apparatus as being capable under certain conditions of giving rise to like impressions. Thus, pruritus being a sensation, it may actually be perceived in consciousness by appropriate changes within the nerve channels without regard to stimuli received at the perceptual end-organs, and this is noticed in those cases without evident pathology. Within the sense of the above quoted law the sensation may arise from stimulation at any susceptible focus in the nervous pathway from the periphery to the cortex. Where are these

points of susceptibility to stimulation and consequent irritation? The presence of the myelin sheath around the conducting nerve fibers precludes the probabilities of stimulation along these pathways, and narrows the probabilities to three points, namely, the peripheral end-organs or amyelinated fibers immediately proximal to them, the synaptic junctions in the posterior spinal ganglion or the lateral horn of the spinal cord, and the synaptic junctions in the cortical cells of the brain.

Cases of pruritus ani resulting from such irritation due to stimulation of the cortical cells by cerebral embolus have been reported by Kober (*Berl. klin. Wchnschr.*, 1885, xxii, 480), but they are extremely rare. Bremer (*Pacific Rec. M. & S.*, 1892-3, vii, 257-60) reports a case due to embolism of the right sylvian artery. They are mentioned for the sake of completeness.

The discussion thus far has brought us to a point where, admitting that a real sensation is evoked, we must needs classify the causes which evoked it. The usual classification of such causes is constitutional, reflex, and local, but since it is intended to make this a complete analysis, it must be pursued until a fundamental basis is struck from which a theory can be erected.

The most fundamental and the most useful classification which presents itself to my mind is the following:

1. Direct pruritus.
2. Indirect pruritus.

Under the heading of direct pruritus we can with good logic place all those various causes which affect their stimulation by direct action upon the peripheral nerve endings in the pruritic zone. The action may be on or in the skin of this zone and still be a direct pruritus.

The group of causes which are included under the generic term of indirect pruritus includes all those causes hitherto called constitutional or reflex. To both these terms I have strong objections on the ground that they are neither descriptive nor accurate; hence, as misleading appellations they should be abolished.

In all cases, in which traumatism of the peripheral nerve endings occurs by virtue of abrasion, avulsion, compression, physical or chemical maceration of the epidermis and con-

sequent irritation of the peripheral end-organs contained therein and the amyelinated nerve fibers immediately proximal thereto, direct pruritus occurs. In other words, such processes are in my opinion sufficient to cause the generation of afferent stimuli of greater intensity than those causing normal tactile sensations, and that these abnormally intense afferent stimuli are perceived in consciousness as an irritation called itching.

In like manner the infective processes of bacterial and parasitic organisms may, by the process of ulceration, chemical maceration or mechanical irritation, cause a similar, direct irritation.

The peripheral location can be demonstrated by the complete removal of the pruritus when the epidermis in this region is infiltrated with local anesthetics or by operative procedure such as sacral nerve blocking or superficial neurotomy.

The factors of this nature may be stated more specifically as follows:

Conditions which produce traumatic irritation by abrasion are condylomata, external hemorrhoids, the chafing of coarse flannel underwear or underwear which fits too snugly in the perianal regions, the reaction incident to horse-back riding, bicycling, or a long continued seated posture as in those people who must pursue a sedentary occupation, and, finally, the use of hard or printed paper for cleaning purposes.

Avulsion is the process accompanying the repeated overstretching of the mucocutaneous margin and the perianal skin in the extrusion of constipated stools. In those rare cases of pederasty and rectal onanism the same condition takes place. In many cases of avulsion this overstretching occurs to such an extent that actual fissures of the anal mucocutaneous margin result.

Those conditions which act by physical maceration of the epidermis and its nerve endings are excessive perspiration and uncleanness. A chemical maceration results in those cases in which the discharges are from leucorrhea, diarrhea, fistulae, or sinuses, as well as when due to solution in perspiration of the dye of poorly dyed underwear. It must be noted, however, that in leucorrhea and diarrhea a primary

condition exists which causes these conditions and contributes, in most cases, to the phenomenon of indirect pruritus.

Those conditions which produce infective irritation in reality act either mechanically upon the nerve endings after ulceration of the overlying epidermis, or, in the case of parasites, after mechanically burrowing through these layers, they act chemically by the chemotaxis to the part of the leucocytic element in the blood stream. The destruction of leucocytes, epithelial cells and bacteria creates the presence of a foreign protein which is chemically irritant to nerve endings.

As to indirect pruritus, innumerable clinical observations and the bulk of medical literature will support the statements that I am about to make. I quote no authorities for the reason that they have been observed and reported by so many that it is needless.

In many of those chronic diseases of the stomach associated with dyspepsia, which is a term for chronic gastritis, there is added to the clinical picture the condition known as pruritus ani.

This is particularly true in cases associated with much gastric fermentation. In these cases a cure or relief of the gastric condition often brings about a parallel relief in the pruritus. Medical literature reports the association, in some cases, of carcinoma of the stomach with pruritus ani. In cases of chronic diarrhea or chronic intestinal dyspepsia, as well as in cases of tapeworms and ascarides, pruritus ani is common. When the large intestine is affected with chronic diarrhea, dysentery or colitis, or when chronic constipation, fecal retention or fecal impaction is present, pruritus ani frequently occurs. The presence of enteroliths has been found to be associated with pruritus ani. Pinworms when present in the intestinal tract are generally most abundant in the lower part of the ileum or in the cecum, and are frequently concomitant with pruritus ani. The presence of scybalous masses in the large intestine has been said to be found in cases of pruritus ani. Cases of carcinoma of the large intestine also appear to be associated, in a number of instances with pruritus ani.

Those portions of the rectum and anus exclusive of the pruritic zone, which become affected with pinworms,

cryptitis, papillitis of hypertrophic papillae, also seem to give rise to pruritus ani. Partial procidentia, catarrhal proctitis, adenomatous, polypoid, or cancerous growths in the rectum, prolapse, ulcers of the rectum, stricture of the rectum, foreign bodies in the rectum, the pressure of a hard fecal mass against the internal sphincter, internal hemorrhoids, any irritation in the anal canal, are all conditions reported in the literature as etiological factors in the production of pruritus ani. It is likewise well known that derangements of the liver, particularly of an obstructive type, and carcinoma of the liver, frequently have pruritus ani as an associated condition. Cases of chronic cholecystitis and cholelithiasis have been reported from time to time as being the cause of pruritus ani. In that chronic disease of the pancreas known as diabetes, in which definite lesions of the pancreatic tissue are evident, we quite frequently have an associative pruritus of the perineum. In like manner chronic nephritis and nephrolithiasis have been reported associated with pruritus ani. Undoubted cases of pruritus ani referable to cystic calculus and chronic cystitis, have also been reported. Chronic urethritis, urethral papillae, granulations of papilloma in the urethra, stricture of the urethra, as well as urethral cysts, and foreign bodies in the urethra have often been associated with pruritus of the perineum. Tumors of the pelvic viscera are prone to association with pruritus ani.

The association of pruritus ani in many cases of uterine displacement, chronic endometritis, and in uterine papillae has long been noted and the inception or recurrence of pruritus ani during menstruation, pregnancy or after menopause has been reported many times. Chronic salpingitis, cystic ovaries and long standing lacerations of the cervix have often been noted in conjunction with pruritus of the perineum. The wearing of a vaginal pessary over a long period of time, the presence of a chronic vaginitis or the presence of thread worms in the vagina have been said to be found with pruritus of the perineum. Masturbation and leucorrhea, while undoubted contributing factors, are probably secondary effects of the foregoing pathological conditions and as such need not be included in a discussion involving primary cause.

Genitourinary surgeons have noticed the frequent association of chronic prostatitis and of a hypertrophied prostate

with pruritus ani, and also the frequent coincidence of chronic seminal vesiculitis, chronic urethral affections and phimosis with this condition. An abnormal collection of smegma has been known as a cause. Similarly, varicocele has been ascribed as a coincident factor.

Bearing in mind the observations above mentioned, it will be noted that the general factor involved is that chronic visceral diseases are very frequently associated with pruritus ani. These chronic visceral diseases are those that are associated in most cases with chronic inflammation, and in almost all cases a departure in size from the normal either by virtue of hypertrophy, hyperplasia, congestion, or distention. Knowing that each of these viscera is supplied with a network of nerve fibers which are particularly abundant in the capsule, it is logical to assume that a departure from the normal size of such an organ would cause the generation of afferent nervous stimuli. Those diseases which Osler states have pruritus as a concurrent condition are diabetes, Hodgkin's disease, hypertrophic cirrhosis, jaundice, lymphoid leukemia, and exophthalmic goiter. All these diseases it will be noted involve a departure in size of the viscera they affect.

This is my firm belief: Whenever a viscus is the seat of a chronic inflammation, congestion, hyperplasia, hypertrophy, distention or dilatation, that a stream of afferent stimuli is generated by the mechanical tension on the neural arborizations terminating in its capsule and that such stimuli are transmitted by the afferent visceral nerves to the central nervous system. These viscera, however, are supplied by fibers of the autonomic nervous system, but these fibers are not able to convey painful stimuli.

Langley and Gaskell have, however, proven that the afferent nerves from these viscera come into synaptic relation with the somatic afferents in the ganglia of the posterior nerve roots and in the lateral horn of the spinal cord (Fig. 26, p. 108). It seems plausible, therefore, to assume that these abnormal afferent impulses from the viscera lead to the stimulation of the somatic afferents by creating an irritable focus in the posterior spinal ganglion, and that the function of sensation being more highly developed in reference to the somatic afferents, the irritant stimulus is referred

in consciousness, not to its true source, but to the place from which such stimuli are habitually received, and, hence, the irritation is referred to the skin of the pruritic zone. *This is a transference of sensation which is exactly analogous in principle to the misreference of pain, but that it is not a true reflex must be evident from an examination of the anatomical facts.*

Now in applying this hypothesis to the particular instance of pruritus ani attention is drawn to the following facts as regards anatomical structure: The pruritic zone is supplied by sensory nerves which have their origin in the first to the fourth sacral segments. These same segments are in intimate neurological connection not only with the pelvic viscera, but also with the other abdominal viscera. It will be remembered that the third with the second or fourth sacral nerves in addition to gray rami communicantes with the sacral autonemics, sends a large white ramus communicans or visceral branch direct to the pelvic plexus and viscera. The intimate connections between the various plexuses—the hypogastric plexus and the aortic plexus—bring the superior and inferior mesentary plexuses into close relation with these sacral segments.

The afferent nerves from the viscera have long been assumed first by Dogiel, and later by others, to end their travel centrifugally by coming into synaptic relation with the cells of the posterior spinal ganglion by means of the white ramus communicans; or by means of the same channel they may pass through the posterior spinal ganglion and end in the lateral horn of the spinal cord in synaptic relation with the commissural cells in the intermediolateral tract at that level or some higher or lower level. The sympathetic neurons in contradistinction to those of the central nervous system have been shown to come into multiple relations to the various segments. It is thus readily seen that this transference of sensation may come in segments apparently removed from the source of afferent visceral stimuli. Clinical observation of the frequent association of visceral disease can thus be linked in a very logical manner with this misreference of localization. This phenomenon is evidenced as pruritus ani of the indirect type; and the fact that it is an indirect pruritus can be clearly demonstrated by the con-

tinued existence of the pruritus after the tissue of the pruritic zone has been thoroughly infiltrated with local anesthetic, after sacral nerve blocking or after superficial neurotomy.

In answer to the question, which probably presents itself to your mind, as to why such a transference of sensation is not evidenced-as pain, it must be recalled that pain like other sensations has a definite threshold. The irritative stimulus which produces the transferred sensation of pruritus is below that threshold, and hence is appreciated only as an irritation to which we have given the name of pruritus.

Everything or every quality felt, is felt in space. Thus the impossibility of conceiving a visual sensation otherwise than outside the body must be admitted. Auditory sensations, likewise, appear in space. Tactile sensations appear to be against the body surface if slight; if of greater intensity approaching pain, they always occupy some organ.

As a matter of fact these patients will tell you that at some time the pruritus becomes so intense that it actually does pain them, and in such cases I believe the threshold of pain has been crossed.

Why these attacks of pruritus ani should be so notoriously nocturnal in their appearance, is another question which presents itself. The answer lies in one of the fundamental laws of psychology known as the "Law of Relativity," which states that we feel all things in relation to each other, or, in other words, that simultaneous or successive sensations modify each other not only in perceptibility of the object but in the quality of it. Thus, during the day, the normal external stimuli received by way of the other senses definitely overshadow the presence of these sensations. However, after retiring, the patient becoming warm in bed, external or peripheral stimuli are reduced to a minimum, even thermal stimuli being so reduced, and the afferent visceral impulses are relatively increased in force, though actually they are probably of the same intensity as they were during the day when peripheral stimuli acted as a constant counterirritative force that decreased their relative value.

## CHAPTER IV

### A CONSIDERATION OF CONTEMPORANEOUS THEORIES

#### A CONSIDERATION OF OTHER CLASSIFICATIONS

That this phenomenon of indirect pruritus is not a reflex condition must be self-evident in view of the foregoing; hence, it will not be further mentioned. It is a misnomer and should be omitted in describing indirect pruritus.

In regard to the so-called constitutional causes of pruritus, one has to consider only the pathology of those diseases to which it is commonly ascribed, to see that the associated pruritus can come under the classification either of direct or indirect pruritus.

Consider, for example, that disease to which pruritus of constitutional origin is commonly attributed, namely, diabetes mellitus. Its mode of action in these cases is presumed to be due to the irritant action of the diabetic urine upon the skin of the pruritic zone. That this is not the case was proven by the experiments of Veit which I have duplicated for my own satisfaction. They consist in the application of pads saturated with solutions of glucose in normal urine, in strengths varying from  $\frac{1}{10}$  to  $\frac{4}{10}$  per cent, over the perianal region for a period of from two to three weeks. No pruritus develops. If the condition be due to the excess of blood-sugar throughout the body circulation, one would expect a generalized pruritus and not a distinctly localized affair such as this condition is. When we consider, however, that in these cases the liver is usually enlarged; that dilatation of the stomach is common; that a diffuse nephritis is often present and that the constant lesion of the disease is a chronic interstitial pancreatitis (with degeneration of the islands of Langerhans in some cases); when we consider all the preceding pathological data we can readily conceive the generation of enough afferent, abnormal, visceral stimuli to cause indirect pruritus. It is also noteworthy that periph-

eral neuritis occurring in diabetes invariably affects the third sacral nerve.

In another condition which is usually given as a constitutional cause, namely, jaundice, it will be noted that in these cases the itching precedes the jaundice; and as good an authority as Osler states in his "Principles and Practice of Medicine": "The pre-icteric itching which Riessman thinks is suggestive of cancer . . . I have seen . . . most marked in gall-stone cases." In this connection it may be said that in hypertrophic cirrhosis of the liver both the liver and the spleen are greatly enlarged, and that in these cases the pain may be slight or, in some cases, not a prominent symptom at all. However, it is in these cases that pruritus may be present in the skin. There is no doubt in my mind that the itching of a well-developed jaundice is a direct pruritus, since the deposition of the bile salts in the intercellular spaces of the tissues of the corium can and does act as a direct irritant of the peripheral nerve endings. However, it may just as probably be an indirect pruritus due to intestinal irritation incident to the changed character of the intestinal juices. The true situation is probably a component of both these factors. In cases of jaundice and cirrhosis of the liver the pruritus can be best accounted for by the theory of visceral enlargement causing indirect pruritus.

Other constitutional diseases which have been mentioned in past literature as being causes of pruritus ani or anal pruritus are rheumatism and gout. Of late years this association has been insisted upon to a less extent than formerly. Bearing in mind the fact that extensive visceral pathology accompanies diseases of this type, it is quite conceivable and logical to conclude that such pathology contributes to an indirect pruritus or, by the circulation in the blood of abnormal products of metabolism, aids in the production of a direct pruritus. In a similar manner the ingestion of drugs such as quinine, antipyrine, mercurial compounds, sodium salicylate, alcohol or arsenic may affect their influence either at the point of absorption in the gastrointestinal tract (thus, an indirect pruritus), or they may by circulation through the capillaries of the papillae in the corium act directly as an irritant to the peripheral nerve endings. It must be particularly noted, however, in reference to the foregoing, that

for either of these abnormal products of metabolism or abnormal constituents of the plasma in the blood-stream, in the nature of drugs to produce a definitely localized pruritus such as pruritus ani, there must exist some pre-existent defect in tissue function or structure to make these parts more susceptible to the action of a circulating irritating substance than the rest of the tissues through which this same blood circulates. If such a condition does not exist we should, theoretically, and we actually do, get a generalized pruritus instead of a distinctly localized affection such as pruritus ani. We may, therefore, reasonably conclude that such constitutional diseases are secondary etiological factors rather than primary unless they mediate their influence as an indirect pruritus.

The influence of improper diet such as the ingestion of highly seasoned food, excesses in eating of particular types of food such as starches and sugars, is exerted by the development within the gastrointestinal tract of a disorder involving chronic congestion, intestinal fermentation or putrefaction. In a similar manner, irregularity of natural habits induces conditions, such as constipation, which, after all, are but manifestations of some basic gastrointestinal disorder.

The ingestion of strange foods, or foods to which the individual is apparently unable to become accustomed, is often followed by a pruritic manifestation which simulates anaphylaxis. As examples of such foods may be mentioned shell fish, such as mussels, scallops, oysters and so forth; also some fish, as, for instance, salmon; certain meats, such as venison and, in some cases, pork; and also vegetables and fruits as, for example, parsnips, mushrooms and strawberries. As to the exact manner in which anaphylaxis induces pruritus more will be said later.

The manner in which various nervous and mental conditions influence pruritus is directly through the effect of the conditions upon the general irritability of the central nervous system and indirectly through the nervous system upon the various viscera. Thus it may be mentioned that worry, overwork, general debility and emotional shock have an action in this manner. It is reasonable to suppose that various drugs, toxic products of digestion, or metabolism may exert part of their influence in a similar manner.

A CONSIDERATION OF OTHER THEORIES OF  
PATHOGENESIS

If we pause a moment to review and consider previous and existing theories as to the etiology and pathogenesis of this condition, it will be seen that they fall, in the main, into four definite groups.

Those theories which have been most popular are, first, that it is of local infective origin; secondly, that it is a result of some form of protein hypersusceptibility; thirdly, that it is the consequence of structural or functional changes in the peripheral nerve endings, and fourthly, a more vague class involving such terms as neurosis, idiopathic, cryptogenic and a host of other semimystical expressions.

Perhaps the most alluring group of theories is that which attributes the condition to a specific bacterial organism. This group of theories has been very elaborately considered and discussed in the chapter on "Bacteriological Findings," pages 41-69. Murray has been the most vigorous exponent of this, and has insisted that it is entirely a skin infection and that the streptotoccus fecalis is the specific organism causing it. This theory would seem to have been very thoroughly demolished by my researches as to the bacteriological findings in these cases and also as to the lack of pathogenicity of streptococcus fecalis. The same researches proved the infection in some cases by staphylococci and probable infection by *B. coli*.

It must be borne in mind, however, that very frequently such infection is not the primary etiological factor as the bacteria are not found in the tissues before the occurrence of a disturbance of epidermal continuity by abrasion, erosion or fissure. *Hence in these cases the pruritus (the effect) having existed previous to the infection (the assumed cause), said infection cannot be considered as a primary cause inasmuch as causes are ever prone to precede effect.* That these organisms can be demonstrated after the breaks in epidermis have occurred is true, but they are then merely contributing factors to a condition whose primary cause is something else.

We may reasonably conclude, therefore, that the majority of these dermal infections are secondary in nature and not primary. They undoubtedly contribute to the pruritus but

are not usually the primary cause. Thus, the pruritus precedes the infection, but has added to it, because of the infection, the factor of direct pruritus. Though the question of whether such infection is primary or secondary is of interest from an academic standpoint yet from a practical standpoint, particularly in relation to vaccine therapy, it matters but little whether the cause is basic or contributory. The fact is that as a cause it must be combated.

I, therefore, admit the occurrence of this infective process, but assign to it a different nature and significance than Murray and other sponsors of his theory.

Theories involving the principle of protein hypersusceptibility in one way or another have more recently commanded attention. For example, Clemons, in an article entitled "True Pruritus Ani, Its Association with Pyorrhea Alveolaris" (*Med. Rec.*, June 1, 1918, xciii, 945), accepts as proven Murray's theory that a streptococcic infection is the cause of pruritus ani, and upon observing the association of pyorrhea in some cases with pruritus ani has suggested that the source of such streptococci may be found in the pyorrheal discharge which has been swallowed and passed through the intestinal canal. While his interpretation is untenable, as must be evident to any bacteriologist, nevertheless the observation seems to have been confirmed by Terrell (*South. M. J.*, February, 1920, xiii, 123), who states that he has observed the association of pruritus ani with such conditions of focal infection as alveolar abscess and tonsillitis.

The occurrence of a case of pruritus apparently due to an absorption of septic material from the mouth in a case of oral sepsis is described in an article by Smith (*Canad. M. Assn. J.*, August, 1916, vi, 724), while a somewhat similar association is noted by Lanahan (*Kentucky M. J.*, March, 1917, xv, 131), in respect to apical abscess or diseased antrum acting as a toxic focus. The incidence of cases of pruritus for which no demonstrable cause could be found except that of food anaphylaxis was noted by Cohen (*J. Am. M. Assn.*, February 5, 1921, xxvi, 327).

These instances of food poisoning, disturbed food assimilation or urticaria resulting from the ingestion of certain foods, are generally conceded to be products of anaphylactic or protein hypersusceptibility phenomena; and the absorp-

tion into the blood-stream of foreign protein from an infective focus or the action of such foreign protein on the blood proteins with the production of abnormal proteins, as exemplified by the clinical instances given in the preceding paragraphs, may logically be considered as allied or identical with the same process.

That the occurrence of anaphylaxis in no way conflicts with my classification of the forms of pruritus of the perineum can readily be seen when we consider that the generally accepted view of that condition is that it is a process involving a change in the blood proteins. These abnormal blood proteins in circulating through the capillaries of the corium change the character of the lymph in the intracellular spaces, and this altered lymph acts as a direct irritant to the nerve-end organs and fibrils. In its last analysis, therefore, the pruritus of anaphylactic origin (in the cases alluded to) is essentially a direct pruritus.

Cases of such origin are more likely to be of a general than of a local nature in the absence of a focus exhibiting some defect in local structure or function, and I am inclined to believe that those cases of pruritus ani which do result from this condition *have* some such local defect which renders them more susceptible to the irritation of circulating irritants in that particular location than elsewhere.

Coming now to that group of theories which seeks an explanation in the discovery of a definite local pathology of tissue fluids surrounding the peripheral nerve endings, we find Lockhart-Mummery (*N. York M. J.*, December 4, 1915, cii) suggesting that a fibrosis of the nerve termination supplying the skin areas affected as a cause. I doubt whether this supposed fibrosis of the nerve ends has ever been demonstrated microscopically, since not even that writer has ever exhibited any microphotographs in support of his theory. I can say with absolute certainty, however, that the chronic productive dermatitis associated with these cases does cause a great increase in the fibrous connective-tissue element of the corium. A review of the report I have made in a previous chapter on the pathology of this condition will show several microphotographs (Fig. 8) which clearly indicate the marked sclerosis of the fibrous connective tissue element throughout the corium, and also how these fibrous strands

are particularly marked at the base of the papillae, at which point the sensory end-organs usually are located. These fibrous strands (Fig. 9) will also be seen to run up into the papillae where they could theoretically exert a pressure effect upon the corpuscles of Meissner and other sensory end-organs.

These facts of the pathology found cannot be refuted. That there is a fibrosis cannot be denied; that it is in a position where by virtue of a progression of sclerosis it can compress and so irritate the peripheral nerve endings will not be denied, *but* the fallacy of the argument which proposes this condition as the cause of pruritus lies in the fact that *it occurs subsequent and not prior to the pruritus*. It is a result of the chronic productive dermatitis induced by the various trauma caused by attempts to relieve pruritus by rubbing or scratching. Hence, it is a result and not a cause. *That it can add a condition of direct pruritus to one of indirect pruritus is entirely logical and in keeping with my clinical and pathological observations.*

Pennington (*N. York M. J.*, February 20, 1904, lxxix, 356) states that in those cases which have come under his notice there has been more or less infiltration and thickening of the skin surrounding the anus, and is of the opinion that this is due to the deposit of an inflammatory exudate in a tissue of a low degree of vitality. This deposit, he believes, disturbs or aids in the disturbance of the normal sense of contact existing between the peripheral nerve ending and the epidermis, causing an irritation or perversion of function which gives rise to the sensation of itching. In respect to this, it must be admitted that infiltration and thickening of the skin does occur, and that a productive inflammation which causes the deposit of an inflammatory exudate in the tissues likewise occurs, *but that preceding all this we have the existence of the pruritus*. It is, therefore, evident, as in the preceding theory, that although this process does occur its significance is that of a contributor of direct pruritus to a preexisting indirect pruritus, though, in some cases, to direct pruritus of other etiology.

We now reach the theory that an alteration in the fluids bathing the peripheral nerve endings is the cause of the pruritus. Lanahan (*Kentucky M. J.*, March, 1917, xv, 131)

mentions among other causes, a departure from the normal in the character of the fluid in contact with the nerve endings and hints that the nature of this change is an acidosis which is generally of intestinal origin. Ground (*Lancet*, April 15, 1916, xxxvi, 232) states that it is due to an irritation of the terminal nerves around the anus, and quotes Unna to the effect that itching results from an irritation of the free nerve terminations in the blood capillaries of the papillae by an increase in capillary pressure.

The determination of capillary pressure or the character of the fluid in the intracellular spaces is, unfortunately, difficult of objective determination. Theoretically, however, we are at loss for a reason for such a distinctly local rise in capillary pressure or change in the character of the tissue fluids except if we assume a primary pathology in such tissue. This, of course, immediately relegates these causes to a secondary status and as such cannot be offered as a primary reason.

That it is due to circulating toxins with a selective action on the peripheral nerve endings of the particular tissue in the pruritic zone is an assumption which, to my mind, puts too much of a strain upon the theory of the selective action of chemical bodies. Certainly when such a toxin circulates it affects all similar nerve endings to a like degree unless the presence of local pathology in a part renders the contained nerve endings more susceptible to its action. But, if we admit this, as we must in view of the facts, then the supposition that such circulating toxins are primary causes of pruritus ani is untenable.

Vaguely stated and abstrusely supported are those explanatory theories which state that pruritus ani is a "neurosis of the skin," "a sensory reflex," and "idiopathy" or a condition of "pruritus essentialis."

For the reason that such theories propound nothing of a definite nature I do not believe they merit a definite refutation. I, therefore, mention their existence merely as a matter of completeness.

If we pause here but for a moment and review the course of our study of this malady, it will be apparent that we have become familiar with its general features and its special characteristics; we have made careful study of the nature of

its pathology and its bacteriology; we have accumulated much data; we have submitted this data to the cold light of reason and have come to certain conclusions as to the etiology and pathogenesis of which we can find good use as a hypothesis or working theory, leaving it, in a truly scientific manner, to crystallize, through continued usage, into a fundamental law out of the strands of our hypothesis. To add one more feature to this hypothesis so as to make it of still more practical value, we will proceed to a consideration of the clinical types with a view of classifying them in order to facilitate diagnosis and treatment.

## CHAPTER V

### DIFFERENTIAL DIAGNOSIS OF THE ETIOLOGICAL FACTOR

The most important point to be held in mind in the determination of the basic cause of pruritus in any given case, is the fact that more than one factor may be involved and that the two clinical types, the disease and the symptom, may be coexistent in the same case. This although of little significance from the standpoint of symptoms produced, is of paramount importance when treatment is to be considered. The truth of this assertion must be evident upon consideration of the foregoing chapter in which the two clinical types are defined, the one with causes within the area affected with pruritus and the other with its causes elsewhere than in this zone. Inasmuch as successful therapy requires treatment and removal of causes, the matter resolves itself into the finding of said causes and the assigning to each of their proportionate significance.

The diagnostic routine which I have adopted in private practice and have used with great success in the Rectal Clinic at Bellevue, where I treat no other disease than pruritus of the anus, is the one which I can highly commend for use by the general practitioner and general surgeon. It is concise, methodical and thorough. However, only one word of caution must be added to this general scheme and that is, that in no case must we cut short our examination because of the discovery of what appears to be sufficient reason for the pruritus. Each case must be run through the entire routine, or results will not be uniformly satisfactory. Without this complete series of examinations described below, there is bound to be some item of pathology overlooked which will by its persistence and extension cause a continuance or recurrence of indirect pruritus and thus nullify or make futile attempts at local relief.

## DIAGNOSTIC ROUTINE FOR CASES OF PRURITUS OF THE ANUS

*History.* This is of immense value in some cases, for it frequently gives a clue to existent chronic visceral disease which the patient might, by virtue of its previous long duration, fail to connect with the condition of which he now complains. Thus, a very important element as to etiology is liable to be overlooked. Again, one often derives information as to habits, diet or indiscretions which serve to direct our investigation along fruitful channels. The questions I recommend are outlined below and relate first, to the general physical condition of the patient and his family, both past and present; secondly, to the physical condition of the gastrointestinal tract, and thirdly, to the local area affected with the pruritus.

*Questions Concerning the General Physical Condition*

1. Has any member of the family suffered, or is any member of the family suffering from the following diseases?

Cancer  
Diabetes  
Affections of the prostate  
Consumption  
Bright's disease  
Syphilis

2. Has any member of the family suffered from varicose veins of the legs?

3. Has any member of the family ever had chronic heart disease?

4. How has his general health been for the past few years?

5. Has he gained or lost weight during the last year?

6. What is the patient's age?

*Note.* These questions have for their object the determination of chronic visceral diseases which may be present, particularly in the matter of cancer. A loss of weight to any marked degree, particularly if the patient is over thirty-five years of age, should be regarded with suspicion.

7. Has the patient ever had a toxic or infective disease?

*Note.* This is to determine particularly, such diseases as malaria, syphilis and various tropical diseases which are

accompanied by a chronic enlargement of the spleen, and which are quite frequently accompanied by pruritus of the perineum. The liver also in these cases is very frequently enlarged.

8. Is the patient addicted to drugs?
9. What medicines has the patient been taking recently?
10. What extraordinary foods has the patient been taking of late?
11. Is the patient a heavy smoker? Tea drinker? Alcoholic?

*Note.* The reason for the above questions is that when certain drugs have been continued for a length of time, a generalized pruritus occasionally occurs. This is particularly the case where the patient has an idiosyncrasy for the drug in question, or where elimination is deficient.

12. Has the patient nocturia?
13. Is the patient's menstruation regular?
14. Has the patient ever had any venereal diseases?

*Note.* These questions are of value in estimating disturbed function of the genitourinary organs, as in the instance of hypertrophy of the prostate, causing nocturia, or disturbances of menstruation being a part of the clinical condition of menopause or pregnancy; finally, a history of venereal diseases makes one suspicious of various chronic inflammatory diseases, such as salpingitis or stricture of the urethra, all of which conditions are often associated with pruritus of the perineum.

### *Questions Concerning the Gastrointestinal Tract*

1. Is there a history of "stomach trouble" or "dyspepsia" in the family?
2. Is there any history of chronic constipation or chronic diarrhea?
3. Are rectal affections common in the family?

*Note.* My experience has been that gastrointestinal affections are more hereditary than the average run of diseases. I consider this especially true in reference to intestinal and rectal diseases.

4. Is the patient constipated?
5. Is he subject to attacks of diarrhea?

6. Does he strain at stool?
7. Is he troubled continually with gas?
8. Has he ever been jaundiced?
9. Has he frequent attacks of "stomach trouble," or "dyspepsia"?

*Questions Concerning the Local Area Affected with Pruritus*

1. Has anybody in the family ever had pruritus of the anus, vulva or scrotum?
2. Has anybody in the family ever had any skin disease?
3. Has anybody in the family ever had any trouble in that region?
4. How does the patient describe the character of the itching?

*Note.* An itching which is entirely nocturnal is almost always anal pruritus. That is, it is indirect pruritus of the anus due to chronic visceral disease. If the itching is more constant, occurring both day and night, there is undoubtedly a direct pruritus present. If the itching occurs directly after defecation the cause of irritation is usually located in the papillae, crypts, or mucocutaneous margin of the anus.

5. Is there any itching elsewhere than at the perianal region?

*Note.* If itching is general throughout the body, its cause is more likely to be of a toxic circulatory nature than a specific local affair.

6. Does the patient ever notice any discharge around the anus?
7. Has the patient ever had any operations on his rectum or anus?
8. Has the patient complete control of his bowel action?
9. Has the patient ever had a course of injection treatments for hemorrhoids?

10. Has the patient any pain with defecation or otherwise?

*Note.* The acrid secretions of fistulae often macerate the perianal skin and chemically irritate the nerve endings directly. Operations on the rectum and anus may leave a sensitive scar similar to what is left in any other region, and may, if unskilfully done, produce incontinence; in this case, fecal matter continually leaks out on to the perianal

region. I have noticed many cases of pruritus which apparently developed in connection with various injection treatments. Pain with defecation suggests the presence of anal fissure or ulcer.

## PHYSICAL EXAMINATIONS

### THE PRURITIC ZONE

The perianal region should be thoroughly examined for a distance of  $2\frac{1}{2}$  inches anteriorly and posteriorly from the anus and about 2 inches on each side. By gentle traction on the margins of the anus it may be divulsed so as to view the mucocutaneous junction in the anal canal. If the skin appears unbroken, of normal color and texture, a tentative diagnosis of anal pruritus may be made, and it can be safely assumed that the cause is outside the pruritic zone, that is, it is above the mucocutaneous margin of the anal canal or in some of the pelvic or abdominal viscera. Particular attention, however, must be given the posterior quadrant of the mucocutaneous margin in the anal canal between the external and internal sphincters, as many cases without other local lesions will be found to have a small fissure, sinus or ulcer in that location. Quite frequently, in these cases, the remainder of the pruritic zone may be quite normal in appearance and lead one to a wrong conclusion. The following tabulation which is really a chart of causes of direct pruritus, and which combines statements to be obtained during the history taking and observations made during examination, will be found of great value in this examination.

### TRAUMATIC

1. *Abrasion.* Use of hard or printed paper for cleansing purposes.  
Horseback riding, bicycling.  
Coarse flannel underwear, or underwear which fits too snugly in the perianal region.  
Condylomata or hypertrophic skin tags at the anal margin.  
Mechanical intertrigo.  
A continued seated posture.
2. *Avulsion.* By repeated overstretching of the anal skin caused by extrusion of hard stool.  
By pederasty, and rectal onanism, resulting in anal fissure.
3. *Maceration.* Excessive perspiration.  
Uncleanliness.

Discharges from leucorrhea, diarrhea, fistulae, or sinuses.  
Poorly dyed underwear.

4. *Compression.* Scar of operative wound enclosing nerve fibrils, and rendered sensitive thereby.

#### INFECTIVE

1. *Bacterial.* Ulcers in the terminal portion of the anal canal usually between the two sphincters.  
Burrowings from anal pockets (sinus). Eczema? Erythema? Herpes?
2. *Parasitic.* Pediculi, scabies, epidermophyton, pityriasis, trichophyton, threadworms, pinworms.

#### THE ABDOMINAL VISCERA

The abdomen should be thoroughly palpated in a systematic manner over each region. The hand must be warm, and the palpating pressure must be gentle lest a reflex rigidity of the abdominal muscles be caused and thus interfere with examination. The face of the patient is to be watched throughout this examination, for his expressions are more reliable than his statements as to tenderness, or pain elicited. If the abdominal muscles are contracted to any extent, thus interfering with proper palpation, the patient may be encouraged to relax them, or the knees may be flexed and a pillow placed under the head and shoulders to diminish the tension. I prefer the following routine for this examination. Examine the right hypochondriac region during inspiration and expiration, and determine the size and consistency of the liver and if possible, the gall-bladder. In this area we may detect an enlarged liver due to passive congestion, hypertrophic cirrhosis, the early stage of atrophic cirrhosis, gumma, amyloid disease, a cancerous mass at or below the hepatic flexure of the colon, or a pear-shaped mass, the gall-bladder distended with mucus, abnormally viscid bile, or enlarged by cancer. I next palpate the right lumbar and inguinal region. Here we may detect by manual palpation a cancerous mass of the cecum or ascending colon, or by deep palpation we may occasionally feel the sausage-shaped tumor indicative of chronic appendicitis. Here also may be detected a fecal impaction in the cecum. In the epigastric region, which is next examined, we may find a mass in cases of cancer of the pylorus of the stomach, cancer of the transverse colon,

occasionally a distended or cancerous gall-bladder in the right side of this area, or an aneurysm of the abdominal aorta. A little lower than this in the umbilical area may be found a dilated and distended stomach, or a mass in cases of an extensive cancer of the stomach, or in a cancer involving the intestine or omentum. Enlarged mesenteric glands either of a cancerous or tuberculous nature may also be discovered on deep palpation. In the left hypochondriac region where the spleen is located, one must be on the alert for any enlargement of that organ. By manual palpation one may detect fecal accumulation or an enlarged kidney. A little lower on the left side in what is known as the left lumbar and inguinal region, a mass would serve to indicate a possible cancer of the sigmoid flexure or descending colon, although this is to be differentiated from fecal accumulation or the presence of enteroliths. In the lower median section of the abdomen, over what is known as the hypogastric or pubic area, may be felt a distended bladder, an enlarged uterus, or a fibroid or cancerous tumor of that organ.

#### THE PELVIC VISCERA

These are to be explored in the male by digital examination by way of the rectum combined, if necessary, with palpation of the abdomen. But in the female this may be most easily accomplished by a complete bimanual examination by way of the vagina, and palpation of the inguinal and hypogastric region. In the female, an ovarian tumor, or masses due to pyosalpinx, or chronic salpingitis may be detected laterally. In like manner an ovarian tumor or cyst of the broad ligament may be felt. In the median line an enlarged uterus, fibroid tumors of the uterus, or carcinoma of the cervix may be felt. Posterior vaginal palpation may detect a carcinomatous mass of the rectum. In the male, rectal examination made digitally will reveal a hypertrophied prostate, distended seminal vesicles, or a carcinomatous mass in the rectum or bladder, or in the prostate. Proctosigmoidoscopic examination may reveal any of the following conditions, all of which are frequently associated with pruritus of the anus: Internal hemorrhoids, catarrhal proctitis, carcinoma of the rectum, adenomata of the rectum, cryptitis and papillitis, polypoid growths in the rectum, partial procidentia,

ulcers of the rectum, foreign bodies in the rectum, pressure of a hard fecal mass against the internal sphincter, stricture of the rectum, and varicose veins of the rectum.

In my own particular practice I often call upon the internist, general surgeon, and gynecologist, for their opinion as to the status of the viscera, and as to the relative importance of the various pathological findings made. Thus a fairer estimate of the proportion of pathological disturbances is made. Inasmuch as the cure of indirect pruritus depends entirely upon the removal or correction of visceral pathology, we must obtain accurate knowledge as to what said pathology consists of, its proportionate significance, and the possibilities of such removals or corrections.

### CLINICAL EXAMINATIONS

*Urine.* The urine is of value only in so far as it yields indications of chronic visceral diseases. Thus the presence of albumin, and casts over a period of time suggest a chronic nephritis, or Bright's disease. Sugar is generally indicative of chronic interstitial pancreatitis clinically known as diabetes mellitus. This finding merely adds a confirmatory feature to the general clinical picture of that disease.

*Feces.* Purulent stools result from fistula in ano, dysenteric, syphilitic, or malignant ulceration, or the rupture of abscesses into the bowel, as prostatic and pelvic abscesses.

Mucous stools are noted in intestinal catarrh, particularly when the lower bowel is affected, as in ileocolitis and dysentery.

Lienteric stools, those which contain much undigested food, are noted in inflammatory conditions of the stomach and upper bowel.

Black stools follow intestinal hemorrhage and the use of certain drugs, as charcoal, bismuth, iron, tannin, etc.

Watery or serous stools are noted in choleraic diseases, in nervous diarrhea, in the colliquative diarrhea, which terminates wasting diseases, in severe enteritis, and in corrosive poisoning, as by arsenic or antimony.

Red stools usually indicate blood, but they may occur also after the administration of hematoxylin (logwood).

Green stools may be due to the consumption of much green vegetable matter (chlorophyl); to the use of calomel or other drugs which prevent the transformation of bile-pigment into urobilin; or to diarrhea, owing to the presence of bacterial pigments or undecomposed bile-pigment.

Clay-colored or grayish-white stools accompany obstructive jaundice. They are seen without icterus in a great variety of intestinal disorders, probably as a result of the faulty reduction of the bile-pigment. Stools may also be light colored from the presence of a large amount of fat.

Fatty stools result from the ingestion of large quantities of fats, from the absence of bile, from various diseases of the upper bowel, and from chronic pancreatic diseases.

Occult bleeding is a term applied to hemorrhages of such small proportions that the blood can be detected only by chemical tests, the microscope, or the spectroscope. When all other sources of blood can be excluded (among others the ingestion of raw meat), occult bleeding is an important indication of ulcer or cancer of the digestive tract.

The blood is nearly normal in appearance after profuse hemorrhages (enterorrhagia) or when it has been quickly discharged, as in hemorrhoids and fissure. Retained blood imparts a black, tarry appearance (melena) to the stools.

Melena may result from (1) traumatism; (2) acute inflammation of the bowels, as in enteritis and dysentery; (3) passive congestion, as in chronic heart and liver disease; (4) vicarious menstruation (extremely rare); (5) blood dyscrasia, as in scurvy, purpura, infectious fevers, etc.; (6) rupture of an aneurysm; (7) ulcers in the intestines, as peptic, typhoid, dysenteric, tuberculous or malignant ulcers; (8) intussusception; (9) the passage of blood from the stomach in hematemesis; (10) hemorrhagic infarction of the bowel from embolism or thrombosis of the mesenteric vessels; (11) piles, fissure, fistula.

*The Blood.* An examination of the blood in cases of this disease is only of value in the determination of the leukemias which are invariably accompanied by chronic enlargement of the viscera, particularly of the spleen and liver.

## CHAPTER VI

### CLASSIFICATION OF CLINICAL TYPES

#### CLINICAL TYPES

The observations and theories as to pathogenesis heretofore mentioned, have for their object and purpose the establishment of such classification as will lend itself readily to use for guidance as to treatment. After due consideration of this problem from every conceivable angle it becomes more and more evident that the classification previously suggested on the basis of pathogenesis is by far the most logical one to utilize for the purpose of formulating definite therapeutic measures.

The extended observations presented in the previous chapters of this book have led me to believe that all cases of pruritus of the perineum can be clinically classified into two definite classes:

The one a *direct pruritus* due to the direct irritation of the peripheral nerve endings in the pruritic zone, in which case the source of irritation actually causes a primary pathology and whose direct nature can be demonstrated by the abolition of pruritic sensation by local anesthetization or superficial neurotomy.

The other, an *indirect pruritus* due to the perception of the pruritic sensation which in consciousness is referred to the pruritic zone, an area which is at the inception of the pruritus devoid of any pathology at all. This phenomenon is due to the transference of an irritable stimulus from the visceral afferent nerves to a normal somatic afferent nerve channel or pathway and the consequent misreference or error in localization. This pruritus, however, induces a desire to scratch which results in the pathological changes previously noted, namely, first a traumatic, chronic productive dermatitis, and in many cases secondly, an infective chronic dermatitis. The secondary pathological changes

in the tissues of the pruritic zone lead to an added component of direct pruritus.

This last described form, that is, indirect pruritus, can be demonstrated to be indirect pruritus by the lack of abolition of the pruritus by local anesthetization, nerve blocking or neurotomy, and by the discovery of a source of abnormal visceral afferent stimuli.

It must be noted that sooner or later in all these cases of indirect pruritus there is superimposed the element of direct pruritus, and that this being affected by the local attempts at relief mentioned above may cause an apparent decrease in the intensity of the pruritus or, by counterirritation, a temporary total relief. The indirect component of the pruritus, however, returns quite soon and from then on is constant in its intensity.

#### DISEASE OR SYMPTOM

From time immemorial opinion has been divided as to whether this condition is a disease or whether it is merely a symptom.

This is quite natural inasmuch as we have no standardized and generally accepted conception as to its exact nature. Nor is general medical opinion definitely formed as to what constitutes a predominant symptom of a disease and what constitutes a disease, the term "disease" often being figuratively and inaccurately applied.

With this discrepancy, on the one hand, in the conception of the nature of the matter in question and, on the other hand; the lack of a fairly defined standard by which to measure it, it is not surprising that opinions should be so diverse. Thus, those who believed in one theory of pathogenesis are inclined to mitigate its importance and pronounce it a symptom, while those adhering to another view have elevated it to the plane of a distinct clinical entity.

A consensus of definitions given by the dictionaries and encyclopedias now in vogue with the medical profession is as follows: The word "disease" is the equivalent for a departure, general or local, from the normal structural or functional status of a vital organism. The word "symptom" represents a circumstance coincident with a disease whose nature, character and location it serves to indicate.

Is this condition a disease *per se* or is it a symptom among others? Measuring the condition as we know it by the standards set forth in the foregoing definitions the following conclusions are reached:

1. It cannot be denied that the direct form of pruritus is in itself a clinical entity. The fissure caused by the passage of a hard, constipated stool, or the maceration of epidermis by the acrid secretions of fistulae may be a definite etiological factor in the resulting disease, but the process from then on is a distinct clinical entity with its own pathology and symptoms. The fact that such conditions as constipation or fistula contribute the inciting agent in no way invalidates the statement that the pruritus is *per se* a distinct entity, any more than the fact that the auto-intoxication causing arteriosclerosis makes this condition a component of the former condition instead of an individual clinical entity.

2. In regard to the other form of pruritus which I have named and classified as indirect pruritus, we are confronted with the fact that there is no primary pathology, that the pathology found is entirely of a secondary nature, and that the pruritus exists before the pathology develops. It is then merely a subjective manifestation of another clinical entity and merely attains and maintains its prominence as a symptom because of the fact that the primary cause is not removed. However, as has been noted, these cases of indirect pruritus sooner or later have added a component of direct pruritus, and in this condition we have pruritus, the disease, concomitant with pruritus, the symptom.

#### NOMENCLATURE

Recognizing the value of using terms with which we are familiar and which have acquired the weight of long usage, I would suggest that we term direct pruritus as "pruritus ani" and reserve the term "anal pruritus" for the form known as indirect pruritus.

Thus an adaptation of existing terms is accomplished, which, without coining any new terms, has the advantage of specifying the clinical nature of the condition in question.

## CHAPTER VII

### TREATMENT

To the general practitioner, or for that matter to the entire medical profession, the most interesting topic in a discussion of this disease is its successful treatment and cure. And a most natural interest it is, for if there be one disease that fills the physician with as much despair as it fills the patient with desperation, it is certainly pruritus ani, vulvae or scroti.

The legion of remedies and cures flaunted in medical literature is proof that no one of them is of general value and that although one may relieve a case here and there it is not a cure in the true sense of the word. When we see cases that suffer as long as ten or twenty years, sampling as they suffer, the thousand and one "cures" known to the general medical profession, we cannot reasonably come to any other conclusion than that they are quite ineffective from the standpoint of true curative ability. Salves, lotions and various operative procedures all prove ineffective in some cases and give but partial relief in others while curing none.

The patient is in an ugly state of mind, his request is so simple and modest: "Stop this awful itching, Doctor," and yet with the best professional acumen the physician can do nothing, but in truly empiric style try something else. It is, indeed, in the treatment of this disease that the high point of empiricism is reached, not only by charlatans but unfortunately by some of the most highly reputed medical men. Textbooks on rectal disease in speaking of the treatment of this disease, say, "treat the cause"—and then give a list of nearly a hundred causes. Why would not the general practitioner despair?

Certain it is that there are cures without number. I myself have gleaned from literature and tried out over four hundred formulae which are mentioned as cures of this disease in many otherwise accurate textbooks on rectal disease. But the general practitioner reading these lines will

agree with me when I say, mildly, that they do *not* cure. There are some, to be mentioned later, which exert a palliative influence or perhaps remove some dominant feature of irritation and so effect relief, but the vast majority of such "cures" are temporary and evade the issue of a real cure.

The inefficacy of the methods in vogue is to my mind a self-evident proposition. When I consider the aforementioned cases which have come to me after suffering ten or twenty years and in one case in my practice, forty years, and reflect upon the numerous physicians who have treated these people during this time, I can come to no other conclusion.

But for every effect there is a good and sufficient cause and the cause of such obvious inefficacy in the treatment of these cases lies in several facts. *First*, the average physician is quite prone to regard this malady in a less serious manner than it rightfully merits. Aside from the practical point of curing these cases the clinical importance of anal pruritus must be evident after reading the foregoing chapters in regard to its diagnostic value as a warning symptom, preceding by considerable time the more obvious symptoms of chronic visceral disease, of carcinoma of the rectum and other viscera. The internist can, if he will, derive much aid from the principle of causation of anal pruritus by adapting it to the diagnosis of diseases causing a similar manifestation. A noted internist of this city confirmed this induction by relating several cases of angina pectoris in which precordial pruritus was noticed.

*Secondly*, the falsely apparent simplicity of this condition often leads the busy doctor to treat this without the solemn consideration he would give almost any other disease and without a due consideration of the causative factors in its production. Of course, some blame belongs to the patient who loses courage after one or two visits to a doctor and drifts off before the doctor has an opportunity to study his particular case. For these cases are perhaps more than any other disease, problems unto themselves.

*Thirdly*, the physician in general practice is not solely to blame for this state of therapeutic looseness. He really cannot be expected to do extensive research work on every puzzling detail of his medical experience, nor could he if he so desired. It is, therefore, obviously the professional duty of those of us

who have elected to be specialists in this line, to make researches on just such moot topics or dark places in the practice of medicine and to relay to the general practitioner the results of such experiments and researches. This has been essentially the impelling motive of this book.

Heretofore the specialist in rectal diseases has told nothing to the general practitioner he did not know previously. He said, "treat the cause," without more than hinting at the possibility of the cause. Within the covers of this book may be found the analysis of such causes, and suggestions as to the differential diagnosis of them. Proceeding from the sound basis of accurate knowledge of the cause, the logical cure can be accomplished, for with a thorough understanding of the conditions existing, treatment becomes less of a problem and more of a definite task.

The greatest factor in the failure of the average practitioner's treatment of this type of case is his failure to recognize the existence of the indirect type of pruritus as, for example, anal pruritus. It must be perfectly obvious by this time that treatment of the peripheral nerve endings must needs be absolutely ineffective in the treatment of this form of pruritus. Superficial neurotomy is, of course, of no avail for the simple reason that the irritative impulses do not come over that pathway. For a similar reason, no salve, lotion or ointment can have the slightest effect except through counterirritative influence which invariably leaves the tissues in a far more irritable condition than they were previously. Thus local treatment actually tends in this type of case to harm rather than cure or even relieve the patient. The only operative procedure which would stand a reasonable chance of influencing the sensation would be a complete section of the posterior nerve roots in the second, third and fourth sacral segments. This, of course, would be rather heroic treatment and would necessarily be attended by grave disturbance of sensation, as well as by untoward trophic changes, in the part supplied by these segments, which in itself is no inconsiderable area. In addition, it is quite conceivable that in a certain percentage of the cases of anal pruritus the transference of impulse from the visceral afferents to the somatic afferents occurs to a greater extent in the lateral horn of the spinal cord than in the posterior

spinal ganglion. Hence operative interference for the resection of posterior nerve roots would not be entirely successful, for the reason that only a portion of the area of transference would be affected by such procedure. And in such a condition where only a partial transference of impulse occurs in the posterior spinal ganglia and a relatively greater transference occurs in the lateral horns of the spinal cord, operative interference to the extent of interrupting this, is of course, out of the question. The only alternative for the proper palliation of the condition, therefore, lies in some drug that will decrease the threshold of irritability of the spinal cord and posterior spinal roots and ganglia. After considerable trial and experimentation in which the action of such drugs as bromides, barbitol and others were observed, I arrived at the conclusion that phenolbarbitol was by far the most effective, although the bromides, properly administered, were closely second in beneficial results.

However, all such palliation is, after all is said and done, merely evading the issue so far as a cure is concerned. It stands to reason that the only logical course to pursue for an absolute cure is to remove or correct, in so far as is possible, the source of abnormal visceral afferent stimuli. In other words, the abdomen and pelvis should be thoroughly examined and such a source found. It has been my custom, and one that I can highly recommend, to refer these cases for consideration and advice to a general surgeon or internist so that I may correct my own bias as to the relative proportionate value or weight of the various pathological conditions found. Then, having definitely fixed upon the conditions needing correction, operative intervention with this in view is absolutely certain to cure the indirect pruritus, for the reason that it removes the cause.

#### ANAL PRURITUS

There are certain situations in which the palliation of anal pruritus is not only desirable but indeed the only sensible course to pursue. For example, a complete analysis of a certain case shows the following pathological findings: A chronic cholecystitis with a hydrops vesicae cholae causing a marked anal pruritus. There are no local lesions evident and no apparent pathology in the perianal, anal or rectal regions.

All other possibilities have been excluded and a laparotomy is decided upon with the purpose of correcting this discovered pathology. There must elapse a certain time, depending upon the willingness of the patient and his relatives, before the operation can be arranged. Perhaps the physician considers the condition of the patient too poor to risk such a severe procedure at this particular time. Perhaps arrangements must be delayed an appreciable length of time for one or many reasons. It is in just such a condition that I consider palliative treatment of anal pruritus justifiable.

Or take for another example a case which is found to have as its causative factor a condition like chronic intestinal stasis with chronic dilatation of the bowel due to abnormal intestinal fermentation. This is a condition which will require a long drawn out course of medical treatment before the trouble is entirely remedied. Meanwhile, palliation of the pruritus is imperative for the comfort of the patient as well as to remove a source of mental disturbance which would in itself unfavorably influence intestinal function.

We have then certain circumstances under which we desire palliation of the symptoms of anal pruritus. Such treatment has for its object the blocking of the transference of nervous impulses of visceral to somatic afferents. Hence, the immediate purpose is the lowering of the threshold of irritability of the posterior spinal roots and ganglia, and of the lower spinal cord segments.

The accomplishment of this is made possible by such depressants of nervous irritability as are listed in the pharmacopeia.

#### PALLIATIVE TREATMENT

In the treatment of this condition exactly what is our objection? What are we trying to do? By what pathway do the irritating impulses come?

One glance at the chart (Fig. 26) will show the utter futility of treatment applied to the pruritic zone. Local operations, x-ray treatment, various electrical treatments, and topical applications are worse than useless in this type of case. The reason will be quite apparent if the above-mentioned chart is fully understood. On this we can see that the irritant impulses, though referred in consciousness to the pruritic

zone, in reality emanate from "a far distant elsewhere." Hence treatment directed to the pruritic zone can be only of value if it partakes of a counterirritative nature. It is my experience that treatment of such a nature is actually harmful, for the reason that it induces a hyperemia in the pruritic zone and may, by maceration or abrasion, impair the

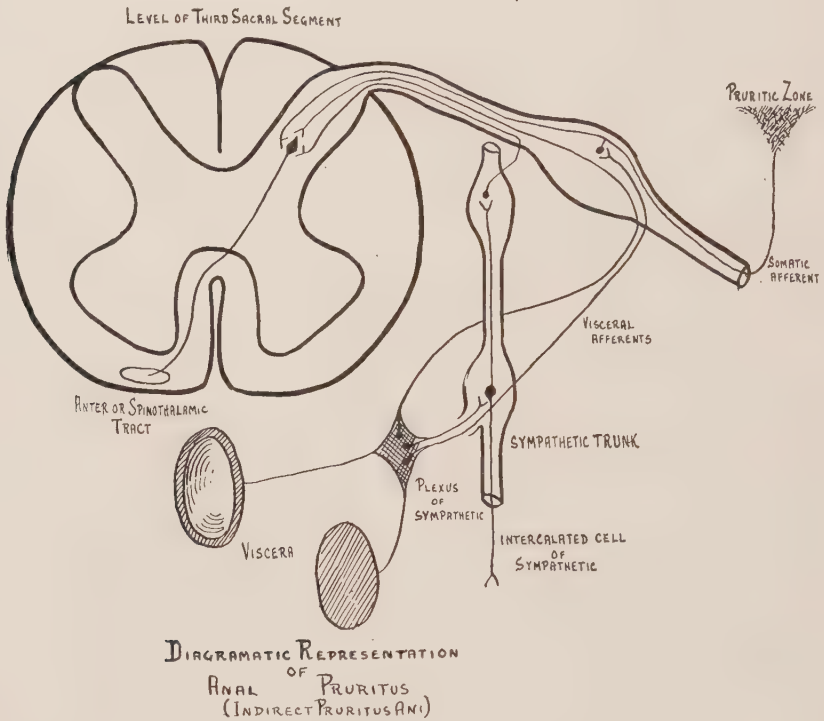


FIG. 26.

continuity of the skin in that region. Because of the continual contamination of this very area by fecal matter, infection is very prone to occur; in such an event we have the added component of direct pruritus.

Our quest for a suitable therapeutic agent is then greatly simplified by cognizance of a definite state of pathological physiology existing in this type of cases. This, as stated in previous chapters, consists in a spread of nerve impulses

from one set of afferent nerve channels to another, the process occurring in the posterior spinal ganglia and the lateral horns of the spinal cord. Our object then is to diminish the excitability of the tissue, that is, of the spinal cord in particular and nerve tissue in general.

What drug will meet the requirements? Omitting details of clinical trials and experiments, I will briefly state that I have found the bromides preeminently well adapted, and I have used them in the treatment of these cases with complete success.

The use of bromides in the treatment of cases of pruritus of the anus is not much of an innovation when we consider that as far back as 1888 Baer made written mention of his observations that they greatly helped cases. At that time their use was vaguely empirical. They were known to depress the nervous system, and this disease being thought to involve the nervous system, their use appeared logical. But their rational use and the obtainance of a consistent success are something new.

Much can be said in justification of medical men of bygone days who have perhaps attempted to use these drugs empirically, and, not meeting with success in every case, abandoned their use. Not understanding, or at least not having any rationale for such treatment, failures, due to an incorrect application of the drug or the use of the drug in an unsuitable case, very naturally tended to discredit the value of the drug. However, in the light of my theory of transferred nerve impulses the rationale of such treatment is quite clear and appealing, for these drugs exert their depressive influence in the very region where the spread of excitation is presumed to occur.

The other factor in the lack of appreciation of the value of these drugs is, as has been previously hinted at, the lack of knowledge on the part of most medical men as to the proper administration of them.

In order to administer any drug intelligently, its properties, both physical and chemical as well as its effect on human tissues, ought to be known to the prescribing physician. A detailed consideration of the group of drugs we intend using is, therefore, quite apropos of our general discussion of treatment.

The bromides are all translucent, white, crystalline substances, possessing no distinctive odor but having a strong, bitter, saline taste. All of them are easily soluble in water and fairly easily soluble in alcohol. They are all local irritants, particularly the potassium salts, which fact assumes real importance when they come to be used in treatment, especially if such treatment extends over any considerable period of time. They do not have any physical incompatibilities.

Absorption occurs readily both from the gastric and intestinal mucosa, and excretion occurs in a peculiar manner, to be described later, by way of the urine, mucous secretions, perspiration and mammary secretion.

The pharmacological action of the bromides may be classified into a local irritant action, a general metabolic depressant of a mild variety and a specific depressant of nerve tissue. This will be discussed in detail.

The local irritant action of the bromides can be elicited experimentally or by unskilled use in the course of treatment either by small or large doses, but such irritant action is, of course, roughly proportional in intensity to the dose. In small quantities salivation occurs and an abnormally great thirst develops. In large quantities, or if the drug be not withdrawn at the first appearance of the above symptoms, gastritis accompanied with a sense of nausea, epigastric soreness and, in some cases, vomiting occurs. Occasionally particularly in cases where large amounts have been taken a colitis is established by the concentrated solution reaching the intestine and diarrhea ensues.

The above mentioned are all symptoms of irritation occurring at the point of absorption, but the drug may give rise to evidences of irritation at the point of excretion as well. Although this is scarcely noticeable in the case of the kidney, it is often quite a prominent feature during excretion of bromides through the skin. Various skin eruptions occur, chiefly of an acne type, and may by infection become pustular. In other cases the skin affection partakes of the nature of a localized blush or erythema. Pigmentations such as copper-colored blotches more rarely occur. These skin disturbances are fairly general in distribution, but the acne seems to have a peculiar predisposition to the skin of the

face. The excretion of bromide through the glands of the skin seem to serve as sufficient source of irritation to cause localized points of inflammation which subsequently become infected with the formation of a pustule. Bromides have been demonstrated chemically present in many of these acne pustules.

*The general action of this group of drugs on the bodily economy is that of a mild protoplasmic poison. It therefore is a weak depressant of metabolic activity. Physical and mental processes are more or less retarded—a feeling of physical lassitude and fatigue combining with a mental attitude of disinterestedness to produce a mild form of general apathy. Headache of a dull, heavy type may be a discomforting symptom. Mental processes are less accurate and spontaneous, thoughts being confused, memory deficient and speech hesitating. If this state of apathy is allowed to continue, a stuporous sleep may result, but such an event is of course an extreme effect. Bad breath often adds an undesirable feature to the condition. The circulatory system is not much disturbed although there is a slight lowering of blood pressure, and the pulse is somewhat less strong. The rate becomes slightly slower than normal. Cushny considers that the cardiac effect when present is caused by the potassium component only and is not elicited by the bromides of sodium and ammonium. Respiration is slightly depressed, if at all. Beyond these general effects the bromides have no notable action, except for their specific action on the central nervous system. This will be described later. It is not considered as being very poisonous to nerve or muscle tissue.*

As to the specific pharmacological action of drugs of the bromide group, it may be said that such action is dependent upon the action of the component ions of the salt when in solution, but even recognized authorities are uncertain as to the relative influence of the respective ions. Thus Sollmann in his "Textbook on Pharmacology," states: "The experimental data in regard to this ion (Br) are as yet very unsatisfactory. Potassium bromide is far more efficient than sodium bromide, and, since other potassium salts also exert a similar action, some authorities have regarded the bromide ion as entirely inactive. This does not

do justice to the evidence, for these other potassium salts are much less efficient than the bromide. Sodium bromide, moreover, is quite effective. However, the potassium aids, and potassium bromide is always preferred."

Cushny in "The Action of Drugs" states: "It was formerly widely believed that the bromides had no further action than the chlorides, and that any effects observed from potassium bromide were due to the potassium ion, the bromide ion being indifferent. There is now no question, however, that the bromides have distinctive effects, for the bromides of potassium, sodium, lithium and other metals induce changes in the central nervous system, which are not elicited by chlorides. At the same time the bromide action is comparatively weak, and the basic part of the salt has therefore considerable influence on their action." Further along in speaking of the action of potassium bromide in depressing the irritability of the spinal cord, he says: "The action on the central nervous system is due to the bromide only, and not to the base with which it is combined. Thus, it may be elicited by the bromide of potassium, sodium, lithium or ammonium while it is not induced by their chlorides. At the same time it seems probable that potassium bromide acts more strongly than the others, because the bromide action is here supplemented by the depressant action of the base."

The essence of the data and opinions submitted above is that the action of the bromide ion on the human body is distinctive though mild, and that its action may be enhanced by the use of potassium as a base.

As to how the bromide ion affects its action, opinion has it that it is a direct action on the central nervous system and such is evidenced by a general depression of the irritability of all nervous tissues. This depression in irritability is especially marked in the spinal cord and is particularly noticeable in the lower segments of the cord. Here it is believed by Bastedo to act in a depressant manner on the primary sensory synapses. Thus Albertoni is quoted as having found that the irritability of the motor areas of the dog's brain was very distinctively reduced by the administration of bromides, and in particular that a stimulus which normally would have spread over a wide area and

given rise to epileptiform convulsion, caused only localized contraction after bromides, while convulsions entirely failed to occur. This and further experiments by physiologists and pharmacologists established the fact that this depression in irritability of the spinal cord makes the passage of nerve impulses within the cord less efficient than normal while the connection between the cerebral centers and the cord remains functionally intact. Although there is thus a prolonged though slight general depression of practically the whole central nervous system, it is a curious fact that the medulla appears to be but slightly affected. This fact is fortunate, indeed, since it permits of continued administration of the drug over a considerable period of time, without any effect upon the extremely important medullary centers.

*In summarizing the foregoing* we may say that the ionic action of bromine is generally considered as being inhibitory rather than paralytic of sensory function. Potassium bromide given experimentally is proven to have a specific depressive action on the spinal cord tissues. Such an action prevents any abnormal amount of freedom of passage of nerve impulses from one part of the cord to another. That this action is more intensive in the sacral region of the cord is indicated by the fact that the sexual instinct, whose center is presumed by physiologists to be located in that region, is markedly depressed or temporarily abolished by bromide administration.

We have then, in potassium bromide and drugs of that group a substance which happily enough affects the exact area we wish to reach and fortunately influences it in the very manner we desire. Its use, therefore, appears most logical.

In the therapeutic administration of the bromides it is well to bear in mind the previously mentioned characteristics and peculiarities of their pharmacological action. Thus the specific action of the bromide ion is only obtainable after large amounts have been taken and even then does not become apparent until such dosage has been continued for an appreciable length of time. Therefore, it stands to reason that no true or pronounced bromide action can be logically expected unless administered in this manner. It is also obvious that no bromide action can be expected from such

drugs as do not dissociate into ions. As an example of these may be mentioned various bromide combinations such as bromoquinine, hydrobromate quinine, monobromated camphor, adalin, brometone, bromomangan, bromural, brovalol, and sabromin. In such compounds the amount of ionized bromine is so small in proportion to the other components that it could not possibly exert its distinctive effect in the doses in which these drugs are used. In some of the above-mentioned combinations the bromine is held in such close organic combination that ionization does not occur at all. Hence, their employment so far as the bromide ion effect is concerned is futile. Concerning this point the volume on "New and Non-Official Remedies," issued by the American Medical Association, has the following to say regarding the bromine derivatives just mentioned:

"Synthetic compounds containing bromine have been produced with the purpose of securing the sedative action of bromine without the objectionable effects of the alkali bromides. These compounds split off bromine ions in the system, the decomposition being due to the oxidation of the organic substance with which it is combined. Too rapid evolution of the bromine is undesirable, while, on the other hand, bromine which is too firmly fixed may fail to become active at all. As the usual indications for bromine action in the organism require a prompt and powerful action on the cells to produce sleep, to abolish reflexes or to arrest an epileptic paroxysm, the synthetic compounds are apt to fail as substitutes for the alkali bromides because their bromine is too slowly evolved. The introduction of bromine into compounds already possessing hypnotic or sedative powers may result in increasing the efficiency of these compounds."

The following bromine derivatives, acting as whole molecules and therefore devoid of true bromide action, are included in "New and Non Official Remedies": Adalin, brometone, and bromural.

One other matter to be considered is that although the excretion of bromide starts soon after ingestion it is very slow in a quantitative sense. With their continued administration an accumulation therefore occurs. The amount excreted rises in proportion to the salt in the blood until a point of equilibrium is reached where the amount of bromide equals approximately the amount absorbed from the stomach and intestines. At this point saturation is said to have

occurred. Traces of the drug can be detected in the urine as long as two months after the cessation of administration. Whether the bromine enters into chemical combination with the protoplasm or not is a matter of speculation. Some believe that it tends to replace the chlorine of the tissues, basing their belief on the main fact that chlorine excretion is increased by the administration of bromide, and the fact that hydrobromic acid can be demonstrated in the gastric juice. This latter occurrence might be explained on the basis of interaction between the potassium bromide administered and the hydrochloric acid normally present in the gastric fluid, but it is also demonstrable as an excretion of the acid forming cells of the gastric mucosa. Cushny believes this replacement of chlorine for bromine to be one of the causes of bromide poisoning.

*The salient facts set forth above are as follows:*

The bromides are particularly well adapted toward the treatment of a condition of indirect pruritus such as anal pruritus and suitable cases of pruritus vulvae and scroti.

They possess certain peculiarities of property and power which merit study in order to use them intelligently.

They are local irritants both at the point of absorption and of excretion, hence they should be prescribed in a dilute form with the suggestion that they be taken after meals and that much water be taken between doses. Likewise bodily cleanliness is to be enjoined to remove those traces of bromine which are excreted by way of the perspiration.

Their true action is obtainable only when given in large doses over a period of time.

Their excretion in quantity is slower in proportion than their absorption. Hence, they tend to accumulate in the system. A condition of equilibrium may be established, however, from which point on the dose may be decreased.

A salt-free diet aids in the speed of effect and the administration of salt aids in the alleviation of symptoms of overdose. This is because of the fact that chlorides increase the excretion of bromides.

The bromide ion effect so far as rapidity and completeness of action are concerned is enhanced by using the potassium salt. The disadvantages of this salt are that it is a circulatory depressant, especially on the heart.

The sodium salt is less effective but is also less harmful. The sodium ion being indifferent and hence having no depressing effect on the heart.

Complications in the form of bromism must be watched for constantly. They are never dangerous to life, but are always discouraging and detrimental to comfort.

*Phenobarbital.* This substance and its sodium salt are white powders, the latter being the more soluble in water, but it is recommended that they be preferably administered in tablets, for the solutions decompose rather easily and should not be kept over one week. Chemically, these salts are derivatives of urea; to be specific, they are phenyl-ethylmalonylurea and its sodium salt. Both these substances have a marked sedative effect, and in moderate doses a hypnotic effect. I do not believe they have any specific depressant action on the spinal cord or on the posterior or nerve roots, but they seem to exert a synergetic action when used with the bromides. I have found small doses very satisfactory when used in conjunction with the bromides, and when so used general depression and untoward effects of the phenobarbital are avoided. When large doses, 3 to 5 grains are used, drowsiness of a persistent type occurs and occasionally also dizziness, headache and nausea. When large amounts are taken continuously more marked symptoms are said to occur such as delirium, mental impairment, circulatory derangements, and ataxia. The use of these substances appears to be contraindicated in subjects with arteriosclerosis, marked pulmonary or cardiac diseases, and in nephritic persons. However, in the small doses that I have found of value in the treatment of anal pruritus, such untoward effects occur only in persons having an idiosyncrasy for the drug. They are mentioned to aid in the recognition of their existence. Exactly how the use of this drug fits into the routine of treatment that I recommend, will be described later.

The routine course of treatment that I have used with gratifying success in the management of anal pruritus is based upon the combined employment of the drugs previously mentioned and described. The beneficent effect of usage may be purely incidental but clinical observations tend to show an actual synergetic action between the drug phenobarbital and the bromides.

In addition to the medication to be described presently I insist on the following in cases where there are no contraindications:

A diet free from spices, meats and particularly salt.  
Frequent tepid or hot tub baths.

An increased fluid ingestion.

Maintenance of proper bowel function.

Medical examination every other day; such examination to consist of an inspection of the skin for evidence of beginning bromide rash; urinalysis for evidence of kidney irritation; knee-jerk test to observe degree of depression that is being exerted by the medication.

On the first day the following is given:

		gm. or c.c.
℞	Potassii bromidi..... ℥i	30.
	Phenobarbital sodii..... grs. vii ss	45
	Tincturæ persionis..... m xv	1.
	Syrupi amygdalæ dulcis, q.s. ad. .... fl. ℥iv	120.
	M. et ft. solutio.	

Sig.: Teaspoonful in one-half glass of water every three hours.

On the evening of the first day I give the following as a cathartic:

		gm. or c.c.
℞	Aloes..... gr. ii	12.
	Resinæ podophilli..... gr. iii	18.
	M. et pone in capsules..... vi	

On the second and third days I continue the bromide mixture but decrease the dose to one teaspoonful after each meal.

On the fourth day I give the following:

		gm. or c.c.
℞	Sodii bromidi..... ℥i	30.
	Syrupi sarsaparillæ compositi..... fl. ℥iv	120.
	M. et ft. solutio.	

Sig.: Teaspoonful in a half glass of water every three hours while awake.

On the fifth and sixth day we decrease this dose to three times daily after meals.

On the seventh day we change to:

		gm. or c.c.
℞	Calcii bromidi..... ℥iv	120.
℞	Potassi citratis effervescens..... ℥iv	120.
	Keep dry and in tightly corked bottles.	

Sig.: One teaspoonful of each powder in a half glass of water after each meal,

We continue with the above as long as is deemed necessary for the comfort of the patient pending the correction of the exciting cause, described in the following chapter.

Should the pruritus at any time recur or show a tendency to increase we revert to the first formula for a day or two and then work back to the third. Fluid is to be forced during this treatment for the reason that by such means better elimination of the chlorides is accomplished and better bromide substitution effected. In diabetic cases we substitute the syrup in the above formulas by water. If headache occurs the *Pulv. potassii bromidi effervescens cum caffeina* (N. F.) is given in a heaped teaspoonful dose. Should symptoms of bromism occur, stop the medicine, give the cathartic capsule suggested above and add salt freely to the diet. The maintenance of proper bowel function is accomplished by the judicious use of the cathartic capsule suggested above.

The foregoing régime has given very gratifying results. It must be borne in mind, however, that its chief claim to value lies in its palliative and not in its curative properties. Relief is obtained but we must go further and prosecute the cure.

Lastly, the possibility of a certain amount of direct pruritus resulting from the existence of the aforementioned condition must be thought of, and if this element is present it must likewise be dealt with (pp. 140-3).

#### CURATIVE MEASURES

All of the foregoing, as has been previously stated, is merely palliative in its purpose. It is not intended in any manner as an alternative of the primary causative agent, or factor. The latter, we have concluded in an earlier chapter, is the derangement of one or more of the abdominal or pelvic viscera. Indirect pruritus of the perineum such as anal pruritus and certain cases of pruritus vulvae and scroti are symptomatic expressions of this disturbed structure and function. Obviously, the logical method to be pursued for the uncompromised cure of such a symptomatic condition is to eradicate the primary visceral disease or derangement. This, of course, sets forth the issue as to whether one should attempt this unaided or whether fuller

justice might not be done by calling in consultation a gynecologist, general surgeon or internist. This is a matter which rests with the judgment of the general practitioner or proctologist. To me it has always seemed wise to hold the consultation.

The epitomized truth about the cure of anal pruritus consists in the clearing up of existing foci of diseased viscera either by medical means, as in the case of intestinal stasis, or by appropriate surgical means in the instance of such conditions as will not yield to medical therapeutic measures. To discuss the proper treatment of such abdominal and pelvic pathology would be going too far afield from proctology. There are many standard books on these diseases, and the reader is referred to them for detailed information as to advisable treatment. The author feels that he will be doing justice to his readers by merely attempting in this chapter to present his own observations as to the relative frequency of occurrence of the various visceral diseases which give rise to anal pruritus. This will furnish the practitioner with a guide as to the probabilities in any given case.

Considering the various viscera in accordance with the groups which physiological function naturally makes, it has been my observation that the greatest proportion of these cases arises in connection with diseases of the gastrointestinal tract, considering as such not only the gastrointestinal tract proper, but also the liver, gall-bladder, and pancreas. A notable proportion, however, arises in concurrence with diseases of the genital system, while a smaller proportion arises from the viscera and structures of the urinary tract.

As to what are the commonest conditions occurring in these respective classes and their order of frequency, I can give but an arbitrary expression of my own experience and opinion. With this fact in mind the following list is presented in the rôle of a guide as to the probabilities rather than as a definite indicator.

<i>Rectum and Anus:</i>	Internal hemorrhoids
	Catarrhal proctitis
	Cryptitis and papillitis
	Polypoid growths in the rectum
	Partial procidentia

	Ulcers of the rectum
	Foreign bodies in the rectum
	Pressure of a hard fecal mass against the internal sphincter
	Stricture of the rectum
	Varicose veins of the rectum
	Carcinoma of the rectum
	Adenomata of the rectum
<i>Prostate:</i>	Chronic prostatitis
	Hypertrophy of the prostate
	Carcinoma of the prostate
<i>Large Intestine:</i>	Chronic constipation
	Fecal impaction or fecal retention
	Scybalous masses or enteroliths in the large intestine
	Chronic colitis (dysentery)
	Pinworms in the cecum
	Carcinoma
<i>Liver and Gall-bladder:</i>	Hypertrophic cirrhosis of the liver
	Obstructive derangements of the liver
	Carcinoma of the liver
	Chronic cholecystitis
	Chronic cholelithiasis
<i>Uterus:</i>	Displacements of the uterus, particularly retroflexion and retroversion
	Chronic endometritis
	Menopause (when senile changes in the uterus occur the utricular glands become hyperactive, and fluid is retained in the uterine cavity)
	Polypi
	Menstruation and pregnancy, even though normal in character, are often associated with pruritus
<i>Pancreas:</i>	Diabetes mellitus
<i>Urethra:</i>	Chronic urethritis
	Stricture of urethra
	Foreign bodies in urethra
	Urethral polypi
	Urethral granulations
	Papilloma of urethra
	Urethral cysts
<i>Vagina:</i>	Long continued use of a pessary
	Vaginitis, chronic
	Leucorrheal discharges
	Masturbation
	Thread-worms
<i>Bladder:</i>	Cystic calculus
	Chronic cystitis
<i>Cervix:</i>	Lacerations of cervix
	Chronic cervicitis with hypertrophy

<i>Small Intestine:</i>	Chronic intestinal indigestion evidenced clinically as chronic diarrhea, chronic or atonic dyspepsia Tapeworms Ascarides
<i>Ovary:</i>	Cystic ovaries
<i>Tubes:</i>	Chronic salpingitis
<i>Stomach:</i>	Chronic gastritis (dyspepsia, and gastric fermentation) Carcinoma of stomach
<i>Seminal vesicles:</i>	Chronic seminal vesiculitis Enforced sexual continence
<i>Penis:</i>	Phimosis Masturbation Accumulation of smegma
<i>Testicle and cord:</i>	Varicocele
<i>Kidneys:</i>	Chronic nephritis Nephrolithiasis
<i>Spleen:</i>	Chronic hypertrophy or enlargement as in chronic malaria

The foregoing list has been presented with the view of indicating those conditions of chronic visceral disease which have been reported in the literature as having had an associated pruritus of the perineum. With few exceptions this record of their occurrence can be corroborated by consulting the literature on the subject of pruritus of the perineum, a bibliography of which will be found at the end of this book. There are a few instances in which the observation has been derived purely from my own experience but the majority of my observations are substantiated by the cases on record. I have, however, arranged on the basis of my own experience the order of occurrence with reference to frequency. This, I am sure, will serve as an aid, not only in diagnosis but in the treatment of the causative factor in the production of any particular case of anal pruritus. For the exact medical or surgical treatment of any of the pathological conditions listed above, the reader is referred to the standard works.

## PRURITUS ANI

### GENERAL MANAGEMENT

The general management of cases of pruritus ani is no small part of the treatment which I have found instrumental in their cure. Of prime importance is the matter of diet, and from this must be excluded, in particular, spices such as

pepper, salt, mustard, vinegar, Worcestershire sauce and all other condiments. Articles of food which have been known to be productive of anaphylaxis must be excluded on general principles, and, as such, strawberries, peaches and certain shell-fish may be mentioned. The use of alcohol, tea and coffee is likewise forbidden as well as the use of tobacco. The latter particularly aggravates the local condition and should be strictly interdicted. Although I do not regard the eating of meat as being directly responsible for the disease, it is, by virtue of the copious seasoning that invariably accompanies its use, indirectly a factor in its aggravation. Meats, therefore, are not allowed.

As to what is allowed: vegetables preferably green, fruits with the exception of the above mentioned, and bland fluids such as milk, peptonized milk or buttermilk are suggested. Spinach, carrots, potatoes, peas, corn and the like may be taken of freely but always with the warning that seasoning be reduced to the minimum necessary to make the foods palatable. Bran bread or whole wheat bread is in my opinion preferable to the usual white bread. The ordinary fruits in season with the exceptions noted, may be taken, also preserved and stewed fruits as prunes, figs, etc. Water should be liberally partaken of.

As to the treatment of this ailment by means of drugs taken internally there have been many suggestions such as the use of pilocarpine, gelsemium, belladonna or cannabis indica, but the great and often grave disturbances to the general physiological economy which frequently result from their use is not worth the meager and uncertain value they possess as antipruritics. Not infrequently they actually increase the local complaint. The use of opium or its derivatives is likewise futile and in many cases decidedly harmful. The only medicine of any value at all in this instance is that suggested at an earlier point in regard to the treatment of anal pruritus (p. 117). In that situation it is employed as a specific depressant of the spinal cord to block afferent visceral impulses. Here it may be used for the general sedative action it possesses and which is often appropriate in cases whose "nerves" are on end from the ravages of their affliction. The use of this formula is, therefore, suggested

with the full knowledge that it possesses no action whatsoever on the peripheral nerve endings affected.

The use of suppositories is utterly useless inasmuch as the medicaments never reach the area upon which their action is desired. They are retained in the ampulla of the rectum till evacuation occurs. They increase rather than alleviate the irritation.

Before suggesting definite measures to be used in specific cases there are several points to be emphasized. Never shave the hair from the perianal region. Although it may appear an advantage at the start of treatment by affording an unobstructed field, it has been observed that when the hairs grow again they are short, stiff stumps which stick into the neighboring skin and induce thereby an exacerbation or recurrence of the pruritus. The scratching that inevitably ensues will often nullify the progress that has been made up to that point.

Regardless of what therapeutic measure is being attempted, whether it be ionic medication, cauterization with silver or the application of ointment, it should always be preceded by a thorough cleansing of the perianal region by means of a lye-less soap and water. Such soap cleanses efficiently without irritating. After cleansing, the area should be thoroughly dried. We then have an area upon which medicinal substances may act freely without the obstructive influence of dirt, secretions, feces or old and caked ointment of previous medication.

When applying medications to the area affected they should always be smeared on and not rubbed on. In the case of liquids they may be applied with a camel's hair brush. Likewise in drying the region it should be mopped instead of being rubbed dry.

The best guide as to the appropriate measures in any given case is the appearance of the skin in the affected area. All cases of true pruritus ani present one of three appearances, each of which has a different and definite mode of treatment. These have been fully described in the chapter on "Pathology" but briefly to restate them here we find cases with visible breaks in the cutaneous tissue, i.e., erosions, scratches or other excoriating lesions; without visible lesions but with dermatitis evidenced by angry red flushing, heat

and dry tense surface; with extensive thickening and radiating folds of hypertrophied epidermis, frequently though not invariably with deep fissures or cracks in the tissue.

#### CASES WITH EXCORIATIONS

In cases with excoriations and general diffuse hyperemia of the area itching is often intense and immediate relief is sought. In such cases invasion of the tissues seems probable or at least imminent, and it is in these that I use the x-ray in the manner described later. A single exposure is recommended for its germicidal value, this, to be promptly supplemented by the following routine which will be found to be very efficient.

The area is gently washed with water as hot as the patient can bear, and with the aid of a lye-less soap the region is cleansed of foreign matter, feces, or ointment previously applied. Rinse with hot water and mop dry with absorbent cotton. Then thoroughly paint the parts affected with a 10 per cent solution of cocaine or novocaine. As soon as the effect of this is attained the entire area is painted with:

			gm. or c.c.
	R	Phenolis	
		Acidi salicylici..... aa 3i	4.
		Glycerini..... fl. 3i	32.
		M. et ft. solutio.	
			gm. or c.c.
or	R	Camphorae	
		Chlorali hydrati..... aa 3ss	2.
		Amyli..... q.s. ad pasta	
			gm. or c.c.
or	R	Camphorae	
		Chlorali hydrati..... aa 3ss	2.
		Phenolis..... gr. xx	1.
		Petrolati molle..... 3vi	24.
			gm. or c.c.
or	R	Spiritus chloroformi..... fl. 3ii	8.
		Glycerini..... fl. 3ss	2.
		Cerati simplicis..... 3iss	6.

Instead of the above it is often advisable, in cases with extensive erosions or excoriations, to follow the anesthetic application with a caustic one such as

			gm. or c.c.
R	Argenti nitratis.....	gr. xxx	1.
	Spiritus aetheris nitrosi.....	fl. ℥i	32.
or	R	Acidum monochloraceticum	
or	R	Acidum trichloraceticum	

followed by painting area with Tincturae Benzoini Composita.

I prefer the use of these drugs in the form of sticks, for the reason that one can get down into the bottom of a fissured area. Suck sticks dipped somewhat like a match can be obtained at any surgical supply house and are far more efficient and economical than cotton swabs.

After the initial effects of these are obtained it is unwise to continue their use. On the second or third day the pruritus has left or is markedly abated, and measures directed toward the protection and healing of the excoriated area are most useful. Here is a very valuable suggestion in the treatment of what is generally conceded to be the most intractable of all anorectal diseases. Many physicians make the error of continuing applications of this kind and by so doing nullify their own efforts. They induce or aggravate a dermatitis which only increases and fastens the itching.

It is in this type of pruritus ani that I consider the use of vaccines appropriate. With bacterial invasion probably present or about to occur, I consider as logical the attempt to build up body resistance against the known invading organisms. The details of such therapy are given in later paragraphs (pp. 140-3).

For the accomplishment of the protective measures which I advocate at this point the following are invaluable:

			gm. or c.c.
R	Balsami peruviani.....	fl. ℥i	32.
	Glycerini.....	fl. ℥i	4.
	Olei Ricini.....	fl. ℥i	32.
	M. et ft. mistura		
			gm. or c.c.
R	Olei cadini.....	fl. ℥i	4.
	Glycerini.....	q.s. ad fl. ℥i	32.
	M. et ft. mistura		
			gm. or c.c.
R	Glycerini.....	fl. ℥i	32.
	Cresol.....	fl. ℥i	4.
	Tincturae benzoini compositae	fl. ℥i	32.

			gm. or c.c.
R	Olei Conii		
	Olei Ricini.....	aaff. ℥i	4.
	Lanolin.....	q.s. ad ℥i	32.
	M. et ft. unguentum	or	
			gm. or c.c.
or R	Zinci oxidi.....	℥vi	25.
	Benzoini.....	℥i	25.
	Petrolati molle.....	℥iiss	50.

Under such treatment the pruritus becomes very slight or ceases, and healing of excoriations and erosions has usually progressed to the point where we may abandon our ointments. The parts are washed gently with a lye-less soap and a heavy lotion is thereafter used. As such the following are useful:

R	Lotio Calaminae et Zinci (N.F.)		
or R	Lotio Alba Composita		gm. or c.c.
	Sulphur ppt.....	℥iv	16.
	Lotio Alba (N.F.).....	℥iv	120.
or R	Magma Magnesiae (N.F.)		

If some slight degree of pruritus remains it is well to use

			gm. or c.c.
R	Lotio calaminae.....	℥iii	100.
	Phenolis.....	grs. xxxv	2.

Even when the parts regain their normal appearance it is well to continue the principle of protection by liberally powdering the area with Pulvis Zinci Stearas. This is especially of value if there is a tendency to intertrigo or excessive perspiration as in fat people.

The following is also of value as a dusting powder:

			gm. or c.c.
R	Acidi borici.....	℥i	4.
	Hydrargyri chloridi mitis.....	℥ii	8.
	Amyli.....	℥i	32.

#### CASES WITH ACUTE OR SUBACUTE DERMATITIS BUT WITHOUT EXCORIATIONS

In such cases the skin is tense and brawny with a smooth, often shiny, surface. There are no breaks in the skin, but if the pruritus is allowed to continue such will inevitably occur. Hence the principle of treatment here is one of protection and adjuvant to resolution.

The area is thoroughly cleansed, in the manner previously described with water as hot as the patient can tolerate and with the aid of a lye-less soap. It is then mopped dry with absorbent cotton. The application of a preliminary anesthetic solution is unnecessary, as the sensation produced by the following applications is not great. With this preliminary cleaning done the next step is to daub the region with

	R	Spiritus rectificati.....	fl. ℥iiss		gm. or c.c.
		Extracti hamamelidis liquidi.	fl. ℥i		70.
		Acidi salicylici	℥i		25.
		M. et ft. solutio			5.
or	R	Glycerini.....	fl. ℥i		gm. or c.c.
		Phenolis.....	gr. xx	or	4.
		Olei amygdalae.....	fl. ℥i		1.
		M. et ft. solutio			30.
or	R	Acidi carbolicii			gm. or c.c.
		Liquoris potassii			
		Olei verbenae.....	aa fl. ℥i		4.
		Olei lini.....	fl. ℥i	or	32.
		M. et ft. solutio			
or	R	Magnesii carbonatis			gm. or c.c.
		Calaminae.....	aa ℥ii		8.
		Mentholis.....	gr. xxx		1.
		Aquae rosea	qs. ad ℥iv or		120.
		M. et ft. solutio			

When the angry, red flush has left the skin affected and the inflammatory induration has somewhat subsided a stimulating medicament is advisable. As such, several National Formulary ointments are available.

					gm. or c.c.
Unguent. Sulphuris Co. (N.F.)					
		Sulphur sublimat.....	℥iv		16.
		Calcii carbonat.....	℥v		20.
		Ol cadii.....		or	
		Sapo viridis.....	aa ℥iv		16.
		Adipis.....	℥ii		64.
Unguent. Resorcin Co.					
		Resorcinolis.....			gm. or c.c.
		Zinci oxidi.....			
		Bismuthi subnitrat.....	aa ℥iss		6.
		Ol cadii.....	℥iii	or	12.
		Adeps lanae.....	q.s. ad ℥iii		100.

Unguent. Picis Co.			gm. or c.c.
Olei picis			
Tincturae benzoini compositae.....	$\overline{\text{3i}}$		$\overline{4.}$
Zinci oxidi.....	aa $\overline{\text{3ii}}$	or	aa $\overline{2.}$
Adeps lanae.....	$\overline{\text{3iii}}$		$\overline{100.}$
M. et ft. ung.			
Pasta Zinci (N.F.)			gm. or c.c.
Acidi salicylic.....	$\overline{\text{3ss}}$		$\overline{2.}$
Zinci oxidi.....			aa $\overline{24.}$
Amyli.....	aa $\overline{\text{3vi}}$	or	
Petrolati molle.....	ad $\overline{\text{3iii}}$		ad $\overline{100.}$
M. et ft. pasta			

The efficacy of the latter I have found to be greatly improved by the addition of phenol, grs. xx to the ounce.

With the return to normal the skin of the area is gently cleansed and a dusting powder such as starch or lycopodium is used.

#### CASES WITH EXTENSIVE THICKENING AND HYPERKERATOSIS

When the skin is monstrously thickened, tough and leathery, devoid of normal color and circulation, active treatment for an absorption of the sclerotic tissue in the dermal layers is of paramount importance. Such fibrotic tissue owing to its presence in the papillae as well as everywhere else in the corium causes persistence of the pruritus by virtue of the irritative compression on the sense organs lodged therein (Fig. 9). Where ionic medication is available its use as described on page 133 is recommended, for it is in this form of pathology that it has been found most effective. The use of the roentgen ray has also been suggested here, but it must be used with great caution.

In many instances neither ionic nor roentgen therapy is practical, for the reason that both require the constant and regular supervision of the physician, and in certain circumstances this is impossible. Treatment by topical applications is, however, certain of favorable results and can be very well carried on under instruction. As in the previous methods, the first step consists in the thorough cleansing of the part with a lye-less soap and water as hot as the patient can bear. The application of an anesthetic in the form of a 10 per cent cocaine solution is not necessary

unless cracks or fissures of the skin are present. The parts are then thoroughly mopped for ten or fifteen minutes with

		gm. or c.c.
℞	Liquoris potassi	
	Acidi carbolyici..... aa fl ℥i	4.
	Olei lini..... fl ℥i	32.
	M. et ft. solutio.	
		gm. or c.c.
℞	Acidi salicylici..... ℥i	4.
	Acidi benzoici..... ℥ss	2.
	Olei Olivae..... q.s. d ℥i	32.
	M. et ft. solutio	

and covered with a sheet of dental rubber dam. A snug T bandage is then applied. This is repeated every other day for three days. On the alternate days the following is applied with a smooth brush

		gm. or c.c.
℞	Glycerini	
	Thiogenolis..... aa ℥i	4.
	Alcoholis	32.
	M. et ft. solutio	
		gm. or c.c.
℞	Alcoholis	
	Olei cadini	
	Sulphuris praecipitati ..... aa ℥i	4.
	Olei Olivae..... q.s. ad ℥i	32.
	M. et ft. solutio	

A fresh piece of rubber dam is necessary every day owing to the fact that the oil rots the rubber. When the skin has responded and thickening is decidedly less, we may change to one of the following ointments used twice daily:

		gm. or c.c.
℞	Hydrargyri ammoniati..... ℥i	1.
	Petrolati..... ℥i	32.
		gm. or c.c.
or ℞	Unguenti cadini..... ℥i	4.
	Kaolini..... ℥ii	8.
	Petrolati molle..... q.s. ad ℥i	32.

When the skin approaches normality in appearance it is best to discontinue applications and then advocate gently

washing in the manner described heretofore, followed by thorough drying and an application of compound stearate of zinc.

In conjunction with the foregoing method of treating pruritus ani by topical applications, I very frequently employ special therapeutic means to meet the needs of the particular case. The following paragraphs are devoted to a description of the method and indications of such measures. Each has its sensible use and each unfortunately has suffered abuse through injudicious application. They are mentioned so that they may be of service in cases warranting their use.

#### METHODS ATTEMPTING STERILIZATION

In that type of pruritus in which breaks in the continuity of the epidermis are evident, as by virtue of abrasions, excoriations or macerations, it may safely be assumed that infection, if not actually present, is at least imminent. In such cases attempts to sterilize the area seem justifiable.

Methods which have this for their object are various electrotherapeutic measures such as roentgenotherapy, radium therapy, the application of high frequency currents, ionic medication and the topical application of various germicidal medicaments.

*Electrotherapeutic Measures.* A wide variety of electrical measures has been employed in the attempt to relieve these cases without much discrimination as to the suitability of the case selected or a full knowledge of the limitations of the methods used. As a natural sequence the method has given rather indifferent results. With the exercise of proper judgment in the selection of cases electrotherapy can be used with splendid results.

If we assume that the potency of these measures lies in their germicidal properties or their ability to cause the absorption of inflammatory exudate, we must select our cases along these lines. The bacteriological studies heretofore described, pointed to the conclusion that infection appeared to be a probability only in the event that the natural barrier to infection, i.e., the epidermis, had been impaired. Therefore, clinically, I regard those cases with visible excoriations or fissures in the integument of the pruritic zone as the most suitable cases for electrothera-

peutics. As to whether topical applications might serve better in any particular case is a matter for the physician to decide. As to the relative value of various methods described in this chapter, little is definitely decided upon by the profession at large, but my own experience has been that roentgenotherapy, ionic medication or certain topical applications to be described later have given the most favorable results.

*Roentgenotherapy.* The use of the x-ray in the treatment of this disease has never met with popular favor, although there have been ardent advocates of its use from whom rather extravagant claims have emanated. Others, in contrary fashion, have deprecated its use and asserted that the danger of producing burns or inducing sterility outweighed whatever palliative value it might have. In the hands of a skilled roentgenologist, and he, of course, is the only one who can be expected to practice safe and rational roentgenotherapy, the question of producing a burn is negligible, and with the use of suitable screens for the genital organs the possibility of inducing sterility can likewise be minimized.

There are undoubted instances, both in my own experience and that of others, where a judicious exposure to x-rays has had a decided palliative effect. There are many others where it has not the slightest effect. Its beneficent power is presumed to rest in its ability to stimulate the catabolism of the cells in the tissues subjected to exposure, and to a certain degree has power in an indirect manner to sterilize and to exert a germicidal influence. The method finds particular use in those decidedly chronic cases where much fibrosis of the tissue in the corium had occurred as in the case shown in Figures 9 and 14. Bearing in mind this indirect germicidal action which cannot be contested it is logical to use radiotherapy where infection is present or imminent. The selection of such cases is best guided by the presence or absence of breaks in the skin or mucosa. I believe roentgenotherapy is most effective when combined with active vaccine treatment.

In those cases selected for treatment by roentgen rays the method usually employed is radiation at a distance of 10 inches for two minutes. A Coolidge tube is used in preference to gas tubes because of its constancy, and because of the fact

that it lends itself more easily to measurements. Under the conditions just mentioned the usual skin unit of 2 milliamperes with a parallel spark of 6 inches is administered. This has an approximate penetration of 6 inches, and has proven a convenient and reliable therapeutic unit. This unit may be repeated weekly subject to variations as to personal reaction. Needless to say, the genital organs are to be protected thoroughly by a lead shield or a lead-rubber sheet. The sterilization produced accidentally is usually but temporary, and only becomes permanent if the treatments are persisted in. MacLeod recommends one-half of a Sabouraud pastille dose with repetition of the same dose on the following day, if necessary, to control the pruritus, or a full Sabouraud dose with a repetition one month or six weeks later.

*Radium Therapy.* Working in association with Dr. Condé Pallen of New York I selected a number of cases believed to be suitable for radium therapy, and this series we then ran with controls. The radium pack was used with emanation tubes of 1,000 millicuries. This was employed in order to make the time of exposure as short as possible. Thus the emanation was used for 1,000 millicurie hours at a distance of about 10 cm. The distance between the radium emanation and the area treated was maintained by placing the radium on top of a box-like stand held over the perianal region by means of springs with little clasps attached. Before each exposure the rectum and anal canal were packed with gauze strips further to protect these parts from burns. The dose mentioned is about as large as we felt justified in giving, as the danger of a burn in this locality is relatively great and its consequences grave. We, therefore, confined our dose to that stated above: 1,000 millicuries at 10 cm. when using the emanation tubes; and 1,000 mg. when using the salt. The time of exposure in each case being 1,000 millicurie hours.

Our results were not very encouraging and were much less so than those obtained from the judicious use of the x-ray. In several cases where an acute or subacute dermatitis was present, and particularly in those cases that had very apparent scratch marks and other evidence of a break in the skin surface, it appeared to have a more beneficent action

than in the remainder of our cases. But, on the whole, its action as an antipruritic was not sufficiently prompt and complete to warrant its recommendation.

Wickham and Degrais claim good results with the use of short exposures of radium rays. They use a large flat applicator and recommend that the treatment be given daily until relieved. However, so little of a definite nature is known concerning the possibilities and limitations of radium treatment, that I prefer to forego judgment. In any event, the large size of the applicator needed, the comparative rarity of the substance, and consequent high cost, would to my mind preclude its use by the physician in general practice.

*Ionic Medication.* Ionic medication, described in great detail by H. Lewis Jones of London in a book of that name, has recently found favor in the treatment of this disease. Rolfe of Boston, at the 1921 session of the American Proctologic Society, suggested its use, and rendered a favorable report on a series of cases he had treated by this method. It is by no means applicable to all cases and is at best a method requiring prolonged attention, and by no means insures a spontaneous relief. It is claimed to have a definite germicidal and lytic power. Rolfe has kindly consented to the following quotation as to the rationale and method of ionic medication in this disease:

Before proceeding with the subject of treatment of pruritus ani by ionic medication, a few brief remarks should be made concerning ionization. The term is used to describe that form of treatment which consists of the introduction into the tissues, by a current of electricity, of one or other of the constituents of the chemical compounds known as salts.

When a substance is dissolved in water, the force of cohesion between molecules is overcome and the molecules become uniformly dispersed throughout the solvent. In the event that the molecules themselves do not dissociate or split up into their component atoms, we have what is known as a molecular solution. Such a solution is a non-conductor of electricity and is of no value in ionization work. Alcoholic solutions are non-conductors and are, therefore, valueless. When a solution of a metallic salt is dissolved in water and the solution is acted upon by a current of electricity, an electrolytic action takes place, in which the ions of the

dissolved salts are set free and conduct and move along with the current in a definite direction and are attracted by one or the other of the poles. Those which are repelled by the positive pole are called electropositive and those repelled by the negative pole, electronegative.

It is a well-known fact that the ions liberated by such electrolytic action on solutions of metallic salts, notably of zinc, copper, mercury, iodine, and many others, have marked antiseptic properties. These, according to Leduc, can be driven into the tissues to a sufficient depth to make them effective in the treatment of infectious conditions, such as the one under consideration where the offending organisms are below the surface and out of reach of the usual ointments, lotions, etc., applied for the relief of the disease.

Jones states that substances introduced ionically enter the actual cells, which would not be the case if the solutions themselves were injected hypodermatically. In the latter case, the fluid would enter and be dispersed principally throughout the interstices of the connective-tissue and be quickly eliminated by the lymph stream. Moreover, considerable irritation would be produced by this manner of administration.

Ionic treatments require a direct current or one flowing constantly in one direction, the voltage of which should not exceed 50.

The apparatus I use consists of a portable motor transformer which generates a low voltage direct current. This is connected with a millimeter, the function of which is to enable the operator to control the electric current so that it can be applied very gradually and without the slightest break in the circuit and also to indicate the amount of current used. From the millimeter the wires run to the electrodes. To enable the operator to distinguish the positive from the negative wire, which is of very great importance in this particular instrument, they are colored red and green respectively.

For ionic applications, two electrodes are necessary. One is a sheet of brass or lead about 18 cm. square, with a suitable binding post soldered to one side. This electrode must be covered with several thicknesses of canton flannel securely sewed at the edges, leaving exposed only the post for the attachment of the wire. This is the negative or indifferent electrode and serves to complete the circuit.

The active electrode, or the one to be applied to the part under treatment, is made of a circular piece of brass or copper

about 6 cm. in diameter with the handle soldered to the center and also fitted with a binding post. The circular disk is bent in such a manner that it will fit into the fold between the nates and come in contact with the perianal skin. The electrode is to be covered with a thick layer of absorbent cotton which can be thrown away after use.

The following aqueous solutions have been found useful in the treatment of these cases:

1. 1 per cent zinc sulphate.
2. 1 per cent zinc permanganate.
3. 1 per cent mercury oxycyanide.
4. 1 per cent iodine (Lugol).
5. 1 per cent potassium iodide.

The first three of the above are electropositive and must be applied with the positive pole connected to the active electrode. The solutions of iodine are electronegative, requiring application with the negative pole.

The manner of applying the treatment is as follows:

The patient is placed on the table, lying on the side, with thighs well drawn up. The large electrode, previously moistened with warm saline solution, is applied to the abdomen and held in firm position by the patient. The active electrode with its absorbent cotton covering well saturated with a warm solution of the salt, is firmly pressed against the area to be treated. The current is then turned on to the motor transformer and the button on the millimeter turned until the needle shows the current flowing. This should be increased gradually until the patient feels a warm sensation. As much current should be used as can comfortably be borne, usually about 10 ma., and the application should continue from fifteen to twenty minutes. At the end of that period the current is gradually reduced to the zero point, bearing in mind not to remove the electrode until that point has been reached. By observing this precaution, the patient will feel no unpleasant shock. This treatment is absolutely safe and cannot cause a burn or the destruction of tissue. Except in severe cases, when a daily treatment is indicated, the applications are made three times a week. When the pruritus is brought under control, the latter treatment is sufficient.

At the beginning of the treatment, the solutions should be diluted with distilled water to  $\frac{1}{2}$  per cent. After a few of these applications, when the skin has become more tolerant,

the 1 per cent solution should be applied. There is a distinct disadvantage in using strong solutions, because irritation of the skin must be avoided. It is most important that the parts be perfectly clean and free from any ointments before the application is made, as a greasy skin is a poor conductor.

Regarding the question of what solution to begin with, I think it may be stated as a general working rule, that in cases with irritated, moist, blanched skins, the milder of the zinc solutions, namely, zinc permanganate, is indicated. If the case does not progress satisfactorily under this application and no improvement in the appearance of the skin is apparent, then the oxycyanide of mercury should be tried. The iodine solution seems to work better in cases where the skin is dry, thickened and fissured. There is really no hard and fast rule for the use of any of these solutions. One skin is more tolerant than another and it may be found necessary, in an occasional case, to use one after another of the solutions before satisfactory progress is evident. The above order of use has, in my experience, met the indications. Improvement in the appearance of the skin, less moisture, a gradual disappearance of the blanched area and less induration, are the outward evidences of satisfactory progress.

After a few treatments, usually after one, the itching becomes more controllable and does not require the digging and tearing of the skin, as was the case before. While the pruritus does not disappear completely in this short time, the attacks are of shorter duration and the intervals between them are lengthened.

The introduction of antiseptic ions has not only a bactericidal effect, but a lytic one as well, and I am convinced that, not until the exudate is softened by lysis and resolution is complete, is permanent relief from pruritus to be expected. The destruction of the organisms is, therefore, only a part of the plan of attack, and must be followed up by treatment directed toward restoring the tissues to a normal condition. My experience with this method of treatment leads me to the conviction that, in the majority of cases, it accomplishes these results if faithfully carried out. Omission of treatment should not be permitted even if marked relief of pruritus follows, but should be persisted in until objective signs of improvement are evident, and then it is advisable to continue the applications for a few weeks after the disappearance of all itching.

Therapy by ionic medication primarily directed, as it is, against bacterial existence and activity can be rationally used only in treatment where infection can be reasonably presumed as an etiological factor. Culturing from the skin surface is worse than useless inasmuch as the delay involved detracts from the patient's comfort and contributes nothing to the ultimate cure. In the light of my observations, we may assume that in a case showing breaks in the skin or anal mucosa or such change in its character as to render it permeable, bacterial invasion is probable, if not present. On that basis any case presenting these lesions may be regarded as a suitable case for ionic medication. It has been particularly efficacious in my hands when used subsequent to an initial exposure to x-ray and when supplemented by intelligent use of vaccine.

#### METHODS ATTEMPTING IMMUNIZATION

On the basis of Murray's theory described in detail in the chapter on "Bacteriology" (pp. 41-69) the use of a streptococcus fecalis vaccine came into vogue some years ago. Reports by physicians as to its efficacy were decidedly contradictory to its presumed value and it never attained universal favor. More recently, that is in 1920-21, various investigators have leaned toward the belief that the condition is due to some other organism. Winfield, claiming the disease to be due to an infection, reports the demonstration of *B. coli* in 80 per cent of the cases with the addition of a mixed infection with streptococcus fecalis in 75 per cent of these and with an epidermophyton infection in the remainder. Both the investigators, it has been noted, basing their conclusions on what I believe to be unsound bacteriology, placed the percentage of cases due to the infection close to 100 per cent and accordingly treated the condition in every case with vaccines.

My own preliminary bacteriological investigation into this condition (p. 53) when summarized, indicates that my findings, using the same method as the previously mentioned authors used shows the presence of *B. coli*, a gram-positive diplococcus (which is referred to as streptococcus fecalis) and of staphylococcus albus in practically all cases with pruritus; in all those cases with rectal disease but

without pruritus, and, it must be particularly noted, in nearly all those cases of normal subjects. I cannot, therefore, take seriously the results of such surface bacteriology which is superficial in more sense than one. All that it proves to my mind is that *B. coli* is a nearly omnipresent organism in the region under investigation, and that both the gram-positive diplococcus called streptococcus fecalis and also the staphylococcus albus are of frequent occurrence. If we wish to assume that, owing to the constant presence and activity of the colon bacillus, it is the most likely infective factor, then we may administer colon vaccine under this assumption, realizing that it is an assumption, and not a proven fact. It would appear justifiable for the reason that colon vaccine has been proven to have a definite, immunological value. In this event a stock vaccine would be theoretically as useful as an autogenous one, for the reason that the colon bacillus has a decided group immune reaction, i.e., a vaccine made of one strain of the group exerts a favorable action on infections due to other members of the same group.

But nothing so commendable can be said of streptococcus vaccine. Lest my own observations should be questioned, I wish to call attention to the opinion of Park and Williams in their work on "Pathogenic Microorganisms," where, speaking of immunity in relation to the streptococcus family, they state: "In none of the natural streptococcus inflammations do we notice much apparent tendency to the production of immunizing and curative substances in the blood by a single infection;" and again, speaking of the practical application of streptococcus vaccine, these same authors say that it is of doubtful value. With this opinion Hiss and Zinsser, in their "Textbook of Bacteriology," seem to agree, for in speaking in reference to streptococcus immunization they assert that "for reasons not wholly understood at present recovery from streptococcus infection does not to any marked degree produce immunity against these bacteria." Inasmuch as vaccines are presumed to exercise their curative influence along the lines of immunity, it would seem highly unlikely that a streptococcus fecalis vaccine would be of benefit in these cases. In extremely large doses their administration may possibly exert a non-specific protein action. Any beneficial action that Murray

might have noticed from the use of autogenous vaccines was undoubtedly due to the admixture of colon bacilli in his vaccine.

It is well to bear in mind that the term streptococcus does not refer to a definite single organism, but rather to a species in which the members of one genus have little immunological relationship with members of other genera, or the members may be completely devoid of any such relationship. On the diagnosis of the causative germ at work and a knowledge of the immunological characteristics of this causative organism depends the selection of the vaccine and whether an autogenous or a stock vaccine is preferable. Thus, many of the so-called polyvalent vaccines are not polyvalent in the sense that they contain representatives based on immunological knowledge.

Reverting to Murray's claims of the value of vaccine in these cases, it will be recalled that he advocated the control of this therapy by opsonic index. But here again the established facts appear to differ. Today bacteriologists do not regard the procedure of opsonic determination with the enthusiasm and confidence which was characteristic when first suggested by Wright. As will be remembered the latter advocated it as a method of controlling the therapeutic administration of vaccine. While we are not concerned here with the whole story of its fall from grace, it will be well to note that no less an authority than Park states that on the whole the method has many uncontrollable variants. Anyone who has attempted the use of this method will agree with this opinion. The same authorities give, as the reasons for the discontinuance of the method, the fact that it is relatively inactive, that almost equal differences can be observed in normal or diseased individuals from day to day and without regard to the injection of vaccines.

To a high degree it is unfortunate that many reports of the beneficial results of vaccine therapy are valueless in connection with its intrinsic worth, for the reason that these reports have been based on the assumption of the specific action of such vaccines, whereas the data given are no guarantee that such was the case and a rational judgment is therefore impossible. The sensible application of bacterial vaccines as specific therapeutic agents involves a correct

bacteriological diagnosis, or at least a clinical diagnosis which would warrant the deduction that infection was present and that said infection was due to a specific bacterium. In view of my own studies in this matter, which I believe to be both thorough and comprehensive, I cannot agree with the broad statement of either Murray or Winfield to the effect that from 80 to 100 per cent of these cases are due to infection, nor are they correct in their assertion that an infection of tissue is proven by any demonstration upon the surface layers of such tissue. Infection can only be proven by demonstrating the invasion of such tissues by the presumptive bacterial agent and its subsistence and propagation therein. Up to the present time there has never been any such proof offered by any investigator. The closest approach was made by myself, as shown in Figures 23, 24 and 25, where I demonstrate the existence of staphylococci in the superficial layers of the epidermis. I would hesitate to pronounce this a demonstration of actual infection. Had organisms been found in the papillary layer of the corium, we might reasonably come to the conclusion that we had proven sufficient invasion of the skin to constitute the state of infection. My cultural experiments on tissues excised from the pruritic area (pp. 66-7) tend to support the contention of Winfield that *B. coli* may invade the tissues and be a cause of infection in certain of these cases. I certainly do not agree with the percentage of incidence which he places on such an occurrence.

#### RECAPITULATION

To state concisely my views as to the suitability of vaccine therapy in these cases, I wish to draw attention to the following chain of facts:

1. My pathological studies support the idea that in a certain percentage of cases bacterial invasion does occur.
2. The only organism which I have been able to demonstrate in situ in the tissues is the staphylococcus.
3. The organisms which I have been able to culture directly from tissue excised from the pruritic area have been the *B. coli* from the deeper layers of the tissue, and the *B. coli* and staphylococcus albus from the superficial layers of the tissue.

4. The fact that I have not been able to demonstrate the *B. coli* in situ in the deeper tissues does not negative its existence there but rests upon a difficulty in staining this gram-negative organism among tissues which in themselves take a gram-negative stain.

5. In all the cases I have seen where sections taken from said cases showed a dermatitis of presumable infective origin, and which gave positive cultures from the deeper layers of the skin, erosions, abrasions, or maceration of the skin in this area were clinically present.

6. In view of the coincidence of clinical evidence that the natural barrier to infection has been weakened and the histological and bacteriological evidence that infection occurs in these cases, it seems logical to conclude that *in cases presenting such clinical evidence infection is either present or imminent.*

7. In pursuance of this line of thought vaccine therapy seems indicated in that type of case which presents the lesions described.

8. The only vaccines that would appear appropriate in view of the aforementioned data are those of *B. coli* and *staphylococcus albus*.

In my experience with the treatment of pruritus of the perineum I have met with most excellent results in selected cases by the combined use of *B. coli* and *staphylococcus* vaccine. I have not, as yet, sufficiently formulated my data on treatment to give the definite percentage of cases in which I have successfully used it, but I will say at this time that the proportion of cases in which vaccine therapy is applicable is decidedly less than is commonly supposed, and by no means approximates 100 per cent.

I do not believe that vaccines, unaided by other measures, will cure an infective case, but they certainly do aid in the palliation of the pruritus pending the eradication of the infective focus and contribute much to the eventual cure by helping in the interruption of the vicious cycle of itching causing scratching and scratching increasing the itching. It is highly desirable that the physician should regard vaccines in general as an aid and not a substitute for procedures directed at the destruction of an infective focus.

The latter should not be delayed because of attempted vaccine therapy.

If then we select our cases properly, i.e., those in which by the presence of excoriations or erosions we can safely assume the presence or imminence of infection, we may be certain of gratifying results. The following paragraphs describe the method I use and advocate in the treatment of cases which I have decided as suitable for vaccine therapy.

*Selection of Vaccine.* Although there are some differences between the vaccines I use and the ordinary stock vaccine they concern the bacteriologist more than the clinician. I will therefore omit details of such procedure. Staphylococcus albus stock vaccine and B. coli stock vaccine have yielded better results than any other vaccines, that I have tried. The idea of making an autogenous vaccine from smears taken from the surface of the pruritic zone is not consistent either with established bacteriological technique or with my findings as described in the chapter on bacteriology. If we are to obtain any result at all from the use of vaccine, I am convinced that a stock vaccine will serve the purpose. I start treatment with staphylococcus albus stock vaccine, and if response is not evident by the third injection commence B. coli vaccine in addition.

*Dosage and Control.* A small dose at the start with a gradually ascending amount until a distinct reaction occurs, appears to be the best method of arranging the doses. When a distinct reaction, either focal or systemic, has been obtained it is well to note the amount necessary to produce this and consider it the normal maximum dose for the individual. This differs, of course, among individuals. From this normal maximum dose all administration of vaccine from that point on is based on this known figure controlling variations by noting the reactions produced.

*Frequency.* The vaccine may be given from one to three days apart, but my own experience favors a two-day interval. I continue treatment while taking other measures, such as ionic medication or topical application, to eradicate the infective focus. In some cases relief is rapid, and if properly selected all cases show a distinct palliation after the first two or three treatments. Vaccine therapy, depending as it does upon the evocation of immune response on the part of

the body, demands a reasonable length of time in which to allow these processes to occur. Likewise, it should be continued for four to six weeks after the primary palliation.

*Technique.* The preferable method of administering vaccine is by subcutaneous injection through a small gauge needle into the buttock, arm or adipose tissue of the abdomen. The other methods available are intramuscular or intravenous, but they possess many dangers, not involved in the above method and no advantages of therapeutic value.

*Treatment by Non-specific Protein.* Treatment by non-specific proteins has yielded an apparently beneficial result in some cases and in other cases has shown absolutely no result. I have used leucocytic extract, typhoid vaccine, various proteins, albumins and peptone with rather indefinite results. There appears to be no relation between the reaction to non-specific protein or improvement on such treatment and the presence or presumed presence of infection in the anal or perianal region. Curiously enough those cases in which I have noticed a palliation of pruritus have been several where I could demonstrate no infection in the pruritic area, there was coincident a focus of infection elsewhere in the body. As example of this, I might mention several cases that showed septic absorption from alveolar abscesses and one in which there was a suppurative sinusitis. On the whole, the results are not striking and the mechanism at work rather vague. Such measures as this cannot compare with the striking and gratifying results one may obtain from the intelligent use of vaccines.

#### METHODS ATTEMPTING LOCAL HEALING AND THE DISSOLUTION OF FIBRIN

These comprise in the main the use of various physiotherapeutic measures such as hydrotherapy and actinotherapy as well as the employment of thermal means by other measures. In addition, certain electrotherapeutic measures, such as high frequency electricity, while having a certain degree of germicidal power, exert in the main an influence tending toward the dissolution of fibrin. Topical applications also find favor in certain cases. Their indications are described on page 129. The type of case to which the measures of this class are

applicable are in general those chronic cases in which much thickening of the skin gives evidence of inflammatory deposit of exudate and fibrosis of the papillary layer of the corium. Such fibrin deposits as shown in Figure 9, undoubtedly exert an irritative influence on the nerve endings in the papillae, partly by their mechanical pressure and partly because of the inherent tendency of all fibrous tissue to contract.

*Physiotherapy.* Application of as great heat as may be borne often affords a temporary relief and if systematically employed aids in the absorption of inflammatory deposits in the tissues and in fibrolysis. The heat may be applied by means of a hot water bag, hot electric pad, hot sand bag, or the application of compresses wrung out of very hot water. In some cases the frequent use of hot Sitz baths is most comforting and efficacious. Cold applications, as a rule, are aggravating to the condition.

The use of various ray lights involving the actinic portion of the spectrum is said to aid in a similar manner; in most cases, however, the dermatitis consequent upon their use increases rather than relieves the pruritus.

The methods just mentioned are by no means certain nor invariably successful, but in some cases give praiseworthy results. They have the advantage, at least in the case of the hydrotherapeutic measures, of being available for use by the patient himself.

*High Frequency Electricity.* High frequency electricity has been used with resonators of the Oudin, or various other types, some with fixed primary and some with variable primaries. The results obtained have only been occasional and temporary. A certain amount of relief, however, may be had in certain cases, from the brush discharges of these high frequency apparatuses or from faradization in the form of a faradic brush or a faradic bath. The use of sinusoidal current and diathermy has likewise been suggested and has found favor with some. The value of the foregoing methods is presumed to be due to a local stimulation of metabolism with the absorption of inflammatory or fibrotic deposit. Electrodes, either vacuum or non-vacuum, insulated or non-insulated, and of suitable shape and design, are utilized to apply the electricity to the perianal region. The application

is usually two or three times a week for a period of from five to eight minutes. Besides the danger of burning the area by too intensive treatment, I might caution those contemplating this method, in regard to another element of hazard. I have seen several cases in which this treatment had been given by means of a glass rectal electrode, and in each instance the glass electrode had broken during the treatment, either because of heat or electrical tension. In cases such as these, the removal of the glass fragments is a task of no small extent and of course, is very trying on the patient. A suit for malpractice might readily ensue from such an accident. All in all, the method is said to be indicated by its advocates in cases where chronic thickening of the integument has occurred.

#### METHODS ATTEMPTING THE PRODUCTION OF ANESTHESIA SURGICAL MEASURES

Nerve stretching produced while divulsing the sphincter has long been known to have exerted a beneficial influence on some cases and to cure others. Those cases which are likely to result in cures are those in which a fissure or several fissures of the skin or mucous membrane of the pruritic zone exist. In all other cases the relief afforded by the procedure is but temporary, the pruritus returning after a variable length of time, generally in a week or ten days. What abatement is furnished is due to the forcible stretching of the nerve fibers contained in the tissues of the pruritic zone or the actual rupture of the delicate end-organs and fibrils.

The technique of the process is extremely simple. The majority of surgeons prefer general anesthesia, and of the various anesthetics ether is certainly the one of choice, though it may be preceded by nitrous gas. Gas itself does not give sufficient relaxation nor does gas-oxygen anesthesia. The use of chloroform cannot be too strongly condemned. The margin of safety is too small to work with, and a simple procedure is at once made difficult and dangerous by its use. In short, for an anesthetic in these cases I suggest ether or gas-ether. The patient should be thoroughly anesthetized before making any attempt whatever at divulsion. During the actual progress of the dilatation all anesthesia is discontinued, as the deep inspiratory effort of the

patient would soon result in an overdose of ether were the administration continued throughout. At a suitable time the operator then commences a very gentle divulsion as in the process of accouchement forcé, dilating in all directions rather than confining the force either to the lateral or anterior and posterior regions. When the anal orifice remains patulous of its own accord after the fingers are withdrawn, the operator knows that sufficient dilatation has been effected. A soft fluff gauze dressing is applied with a fairly firm T-binder. Morphine gr.  $\frac{1}{4}$  with atropine  $\frac{1}{120}$  should be given postoperative as required. The patient is then placed on a liquid or at least a light diet, and the bowels confined for three days by the use of Tr. Opii, 10 minims three times a day. At the end of the third day a mild cathartic is given and the patient discharged.

A variation of the above method which I use in some cases is that of giving a local anesthetic instead of a general anesthetic. Needless to say, the dangers of an anesthetic are eliminated thereby; hence it is of superior value not only in instances of cardiac or nephritic persons, but to my mind even in the ordinary case. The only objection to its use is that a certain amount of skill is required in the production of said local anesthesia. In proper hands this method will give as good or better results than the former, since just as complete a dilatation may be performed. One other form of dilatation practiced, often by the laity, is that of various dilators made of hard rubber, bone or metal. They are used in sets of various sizes, the smallest being used at first and then gradually the larger ones inserted. While this is often an easy way of treating selected cases and one in which some cases thrive, it should never be left to the patient, as disagreeable consequences may ensue by the passage of the dilator upward into the ampulla of the rectum. I have had occasion to remove several dilators from the rectum, and, although the procedure is not particularly dangerous, it never partakes of the nature of keen delight. Allingham, many years ago, suggested the insertion of just such a bone plug into the anus at bedtime to prevent nocturnal attacks of itching. He based this suggestion on the fact that some of his patients claimed they could get relief by keeping a finger in the rectum while sleeping.

The use of the cautery has been advocated and practiced for many years. Sir W. Mitchell Banks was the first strenuous supporter of this method, and claimed many good results. Various forms of the cautery have been used, the actual or Paquelin first, and during more recent years the electro-thermal cautery. Both methods, of course, depend on heat for their cauterizing effects.

The exact procedure is as follows: After thoroughly cleansing the parts and drying, the cautery point heated to a cherry red glow is passed lightly and rapidly over the affected areas, the object being to cauterize the skin down to the papillary layer. Particular care is taken to touch to the bottom of the fissures and excoriations and between the sulci which so often accompany this condition. General anesthesia should be used and gas-oxygen is to be preferred, although ether may be used if care is taken, as in all operations involving the cautery, to keep this apparatus away from the ether. There are, however, many untoward possibilities in this treatment, chief among which are the sloughing and ulceration which may result if the operator cauterizes too deeply in his zeal to be thorough. These ulcerations are extremely slow to heal, not only because of the continual presence of infectious fecal matter, but also because of an apparent lowering of the vitality of the tissue itself. Again, the pronounced contraction of the scar tissue resulting from such burns, often results in a serious impairment of sphincteric function; all of which does not, of course, add anything to the comfort of the patient.

In conclusion, the method has been found rather wanting in value, besides being very trying to the patient. It is mentioned for the sake of completeness and for the purpose of dissuading those who are using or contemplate using such a method.

Various French surgeons have made use of the process of curettage with rather meager results, considering the discomfort involved in the method. The operation merely consists in the thorough scraping of the affected parts with a sharp spoon curette down to the true skin. This is done under general anesthesia. However, this method is bound to be imperfect in its results, since it does not remove the previously mentioned pathological processes in the deeper papillary layers.

The various plastic operations which have at various times found favor with the profession started with the suggestion of Mathews that the affected tissue be removed by extensive dissection and resection (Fig. 27). This consists in



FIG. 27. Mathews' perianal skin excision. Lines of incision indicated.

essentially a circumferential incision of the perianal region and a resection of the skin well up into the anal canal.

Mathews describes it as "a neat dissection of all the involved tissues around the anus, including from  $\frac{1}{2}$  to 1 inch of the anal canal." After dissecting the skin as described, it is pulled down by forceps and divided into several sections, usually three. Each section is now tied off at its base with a

silk ligature. They fall off in a few days and the wound is left to heal by granulation. This procedure is reputed (by Mathews) to afford perfect relief in the cases operated upon. A somewhat similar method was described about the same time by Hamilton.



FIG. 28. Cripp's partial perianal skin excision. Lines of incision indicated.

Surgeons in general did not take kindly to this method and its use did not become general. To be sure, it is rather heroic treatment, as healing is naturally protracted and the resulting scar considerable with great contraction. Sphincteric control is rendered imperfect. And in addition to all this the suffering from pain is no inconsiderable item against its use.

Although this method was in itself extreme and impracticable, it suggested to other surgeons various substitute procedures which are in use today, hence it has served a useful purpose.

Cripp, noticing the frequency with which pruritus is associated with the presence of indurated areas in the posterior and less frequently anterior raphes, recommends (Fig. 28) the removal under local or general anesthesia, of a triangular piece of skin with its base at the anus. This is dissected entirely away and then the edges are brought together with fine horsehair sutures. The depth should only be just through the true skin and the size of the piece about  $\frac{1}{2}$  inch at its apex and 1 inch at its base.

The above is obviously a modification of Mathews' method, only less radical in its extent. It is incomplete; and that it yields indifferent results is the opinion of most men who have tried it.

Hamilton of Columbus, O., advocates the following operative procedure which he claims he has employed with unvarying success. After the usual preparation of the field of operation, simple radial incisions are made parallel to the perianal folds, extending as high into the anal canal and as far out on the perianal skin as the itching occurs or any alteration is evident in the tissues. These incisions are made through the mucous membrane and cutaneous layers down into the superficial fascia. He further suggests that this procedure be done in stages under local anesthesia; the posterior raphe and one anterolateral fold is done at one sitting; a few days later one or two other folds are similarly treated, and so on until the whole of the pruritic area has received attention. As for the postoperative treatment of these incisions, he recommends merely keeping the edges of the incisions apart with dry sterile gauze dressings. The theory of this procedure is that "it induces a distention of the perineural tissues by anesthetic fluid and that metabolic changes are affected in the nerve fibers involved, due to the granulation process."

The method has never been productive of the favorable results mentioned by Hamilton, except in his own series of cases, and does not compare with more easily demonstrable beneficial effects of other types of operative procedure to be mentioned later.

Sir Charles Ball of England was the first to formulate a method which had for its definite object the section of the peripheral nerve endings, in other words, a superficial neurotomy. His plan of operation may be briefly outlined as follows:



FIG. 29. Sir Charles Ball's operation. Lines of incision indicated.

“The skin having been cleansed as completely as possible, a curved incision is made on each side of the affected area (Fig. 29) enclosing the entire ellipse with the exception of a narrow neck in front and behind. The incisions are carried down to the sphincter muscle, and the flaps raised by careful dissection with scissors from the surface of the muscle,

round its anal margin, and up the anal canal to above the mucocutaneous junction, the dissection extending round the entire circumference, all connections with the subjacent tissues being divided. The pedicles in front and behind are now undercut to a point well beyond the area of irritation, and the outer concave edges of the incision also undercut to a distance of at least  $\frac{1}{4}$  inch free of the involved skin all around. Care must be taken to stop all bleeding and the flaps should not be replaced until it is completely arrested, as the formation of a hematoma in the wound might compromise the vitality of the flaps. The flaps are finally replaced and retained by sutures, a few intervals being left between them for drainage.

"The immediate result of this operation is to render the entire ellipse included between the incision, the pedicles and the outer edges, as far as they have been undercut, superficially anesthetic and the itching is at once relieved."

The foregoing are the views of Sir Charles Ball in regard to the technique of his operation and its beneficent results. It is an absolutely certain method of relieving direct pruritus (pruritus ani) although rather heroic in its measures. It is quite as certain *not* to relieve a case of indirect pruritus (anal pruritus). I know, among others, of two such cases that retained their pruritus after just such an operation, but were promptly cured some months later by the removal in one case of a chronically distended gall-bladder and in the other, of an ovarian cyst the size of an orange.

Although the method is applicable and efficient in a certain type of case, it has some disquieting disadvantages. The operation, of course, demands a general anesthetic which is unnecessary in other types of operative procedures to be described later. Most surgeons who have adopted this operation agree that the danger is that the inner flap is made to suffer impaired circulation and that accidental nicking of this flap often results in a considerable amount of necrosis and consequent delayed healing with obnoxious scar formation. The field of operation is decidedly bloody regardless of assiduity in sponging, and this renders technique difficult and makes the operator rely upon his sense of touch. Errors in touch being unavoidable some nerve fibers are apt to be left, thus defeating the object of the operation.

Sometimes the radiating anal corrugations are mistaken for other tissue and cut, with the result of a necrotic area. A skin tag cannot be removed without causing the same result, thus exposing the dissected area to infection. The sutures are



FIG. 30. Dr. Thomas Charles Martin's modification of Ball's operation.  
Lines of incision indicated.

said rarely to hold the flaps in apposition because of activity of the anal muscles. Not a few surgeons have reported the occurrence of a hematoma, despite care, at the time of operation. This invariably, if neglected, ulcerates with disastrous consequences.

As for my opinion of this procedure, I can only say that I regard the principle involved—the severance of the nerve fibers supplying the zone—as the keynote of the rational cure of some forms of pruritus ani, but I believe that subsequently better methods of accomplishing the same result have been proposed.

Thomas Charles Martin of Washington, D. C. suggested a modification of Ball's method to obviate the disadvantages set forth above. This author suggested leaving two additional pedicles, one on either side similar to the anterior and posterior ones left by Ball (Fig. 30), the object of this being to furnish the central flap with sufficient circulation. The dissection in this operation is done to a large extent by undercutting, which feature attains considerable prominence in operations proposed subsequently. This operation, though imperfect in comparison with those now in use, nevertheless is decidedly less mutilating than Ball's and accomplishes the same end. The strip of skin left on each side as well as in front and back entirely precludes the possibility of malnutrition of the central flap.

This procedure is mentioned not only to give its author credit for realizing the need of maintaining the normal circulation in the central flap, but also to show the transition from the pioneer operation to those now in vogue. Its practical utility is negligible in view of more satisfactory methods at our disposal.

Louis J. Krouse of Cincinnati, suggests a method which is different from that of Ball's or Martin's and consists in abandoning the elliptical incisions that interfere with the circulation of the operative area and the use, instead, of six or eight linear incisions through the skin into the subcutaneous connective-tissue (Fig. 31). These linear incisions, beginning at a point outside the point of irritation, follow the course of the radii of a circle whose center is the anal canal. The skin lying between the adjacent radii is then undercut until the whole affected area is undermined. Should the dissection be difficult, and more room be needed, then every alternate flap can be loosened at the anal margin and dissected outward toward the periphery. After all adhesions are loosened and the bleeding has been stopped, the parts are again replaced and sutured.

The advantages of this operation over the original one of Ball, lie mainly in the better nourishment of the flap. The blood must come from the circumference and must radiate towards the anal canal. In the original operation, it enters

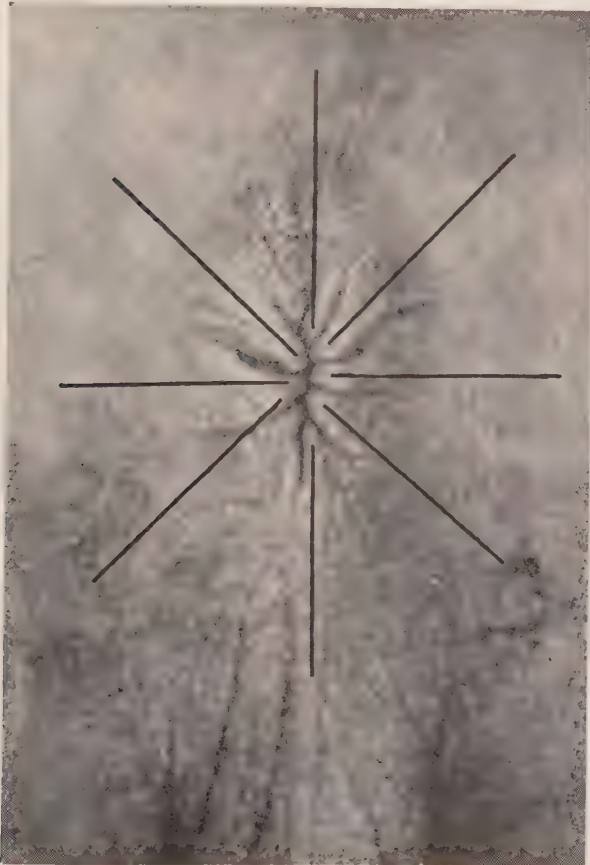


FIG. 31. Krouse's operation. Lines of incision indicated.

only through the two pedicles of skin attached to either extremity. In this operation the blood comes from the periphery, from the entire circumference of the flap. It is more direct in its course; it is closer to its source of supply and its quantity is more abundant. The vitality of the flap, therefore, is better assured.

This operation is commendable in so far as completeness and the obviation of stricture is concerned, but is extreme in its measures in a manner similar to the preceding. The operations next described are much more simple and in many cases quite as effective.



FIG. 32. Lynch's operation. Lines of incision indicated.

Jerome M. Lynch advocates a method which has given satisfaction in the hands of many, and possesses none of the disadvantages of the previously described operations. The entire operation may be performed under local anesthesia and is devoid of more than temporary or passing inconvenience and discomfort to the patient. To quote Lynch:

"The patient is placed upon his left side, with knees and thighs flexed. A point is chosen about  $1\frac{1}{4}$  inches from the anus. At this point a 1 per cent solution of novocaine or a  $\frac{1}{2}$  per cent solution of cocaine is injected. An area extending to the posterior midline is anesthetized. At the point above mentioned a small curved incision is made, about  $\frac{1}{2}$  inch long, and extending just through the skin (Fig. 32). Through this incision a blunt-pointed dissecting scissors, curved on the flat, is introduced. With this instrument a blunt subcutaneous dissection is now carried out, working to the anus mesially and to the raphes anteriorly and posteriorly. When completed, there is an area of skin within a radius of  $1\frac{1}{2}$  inches from the anus, which has been deprived of its sensory nerves. Any bleeding may be controlled by pressure. When the bleeding has stopped, a small piece of rubber tissue is introduced into the incision and permitted to remain from twelve to twenty-four hours. Sometimes, in addition, a horsehair stitch is taken through the incision, but this is not usually necessary. As a rule, at the end of forty-eight hours the wound is entirely healed. Either at the same sitting or at some subsequent time the same procedure is followed on the other side."

Although this method of operation obviates many of the complications prone to occur in those described previously, although it makes scar formation a negligible factor because there is a minimum of this, yet the method is apt to give incomplete results—itching either persisting to a certain extent or recurring after a time.

Samuel G. Gant used a method similar to this with the modification of four instead of two incisions to allow undercutting. The method is open to the same criticism, recurrence is liable to occur owing to incomplete severance of the sensory nerve endings.

Experience with the previously described operative procedures has disclosed many imperfections both of the methods used and the results obtained. Some of these have been mentioned heretofore, but I believe them of sufficient importance to repeat them at this point. In the operation of Ball the danger of hematoma formation with consequent sloughing and the occasional focal necrosis of the central flap due to impaired circulation, adds to that procedure an

undesirable element of hazard. Krouse's operation leaves long scars which, besides detracting from the patient's comfort, frequently appear to be the seat of a recurrence of the pruritus. Lynch's operation, while more conservative, is more apt to be incomplete, owing to the difficulty of undercutting the medial parts due to the natural depression posteriorly between the nates. It is also quite difficult to undercut the anal mucosa through the limited incision of this operation. Gant has attempted to meet this difficulty by employing four rather than two incisions such as Lynch uses, but the efficient undercutting of the anal mucosa, which I believe to be of utmost importance, is not possible with either of these methods.

Observations on the relative effectiveness of the above-mentioned operations has gradually led me to the conclusion that their shortcomings lay partly in the method and partly in mechanical deficiencies of the instruments used.

In my opinion, the method that will meet the deficiencies noted earlier and attain the results necessary for success will be an operative procedure which will have for its objective the production of an absolute loss of local tactile sensation by the complete severance of all nerve fibers in both the perianal region and in addition the terminal three-quarters of an inch of the anal canal. It is highly desirable that this procedure should be done with a minimum of disturbance to circulation and with a minimum production of scar tissue. Further, the method must be supplemented with some form of postoperative treatment whose object shall be to prevent the reunion of severed nerve ends or the growth distally from the central nerve fibers. It is only by such measures that we may be certain of a complete and permanent result, and at the same time obviate the hazard of hematoma formation and sloughing due to disturbed nutrition.

The mechanical deficiencies of the instrument commonly used in this operation consist in the inability of the ordinary type of scissors to reach, without traumatizing by distortion, the tissues posterior to the anus between the folds of the nates and those tissues in the anal canal. When pointed scissors are used there is an added danger of making accidental openings in the skin being undercut, or "button-holing" as it is called. To anyone who has done many of

these operations, it is particularly evident that during the manipulation of the scissors through the skin wound much traumatism is usually caused at this point, frequently impairing the vitality of its edges to such an extent that a postoperative ulceration of the wound edges occurs. Although

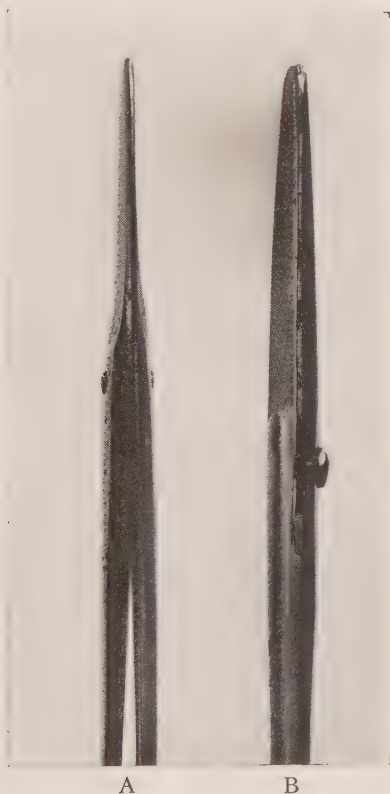


FIG. 33. Note thinness of blades of author's scissors (A) as compared with ordinary operating scissors (B).

never dangerous, it has no advantages and can be entirely avoided by the use of the instruments described below.

In an attempt to remedy the mechanical shortcomings of the instruments usually used in this operation, I devised a special type of dissecting scissors which has given me very satisfactory results. It is essentially a very thin-bladed and blunt-pointed scissors (Figs. 33 and 35), of which I use a flat and a curved-on-the-flat model. The features of this special type of scissors are first, in the crossing of the

handles that permit a maximum spread of blade with a minimum of bulk at the pivot screw which is the part of the scissors resting in the operative wound during the undercutting (Figs. 34 and 36). Secondly, my special dissecting scissors possess four cutting edges instead of two as in an ordinary scissors. This is accomplished by giving the external edge of the scissors' blade a belly similar to that of a bistoury with a very keen edge. Thus while ordinary scissors only cut during the process of closing, the type that I have devised cuts during the process of opening as well as during that of closing. This adds very markedly to their efficiency, both from the standpoint of complete severance and from that of rapidity of action. The ability to open these scissors to their full extent with only a minimum of bulk at the pivot, makes the matter of traumatism at the point of incision a negligible one. Owing to the small bulk of the scissors shank, the incision need never be more than  $\frac{1}{4}$  to  $\frac{3}{8}$  inch. The angle of the curved model conforms with that of the depression between the nates and, when reversed, conforms with that of the anal canal.

#### AUTHOR'S OPERATION

The operative procedure that I now use is one moulded along the lines of the original Ball operation, i.e., its basic principle is that of undercutting. It is, of course, the natural sequence of events that anyone who uses an operation of this kind very extensively should sooner or later introduce modifications in its technique, which have gained favor by virtue of good results obtained. The aim of such deviations from the original technique is to minimize or obviate the shortcomings of the pioneer operation and to accomplish new aims.

*Preparation.* The day previous to the operation the bowels are completely emptied by Pulv. glycyrrhiza co., and the morning of the operation a low enema of saline is given. The area, i.e., the perianal region and the lower anal canal, is prepared by shaving and thorough washing with sterile liquid soap and rinsing with sterile water. Following this the area is bathed in Harrington's solution. In the case of a male, when general anesthesia is used, the testicles may be held back out of the field of operation by a towel saturated in the

same solution. One-half hour before the operation a hypodermic of  $\frac{1}{4}$  grain of morphine with  $\frac{1}{150}$  grain of atropine should be administered.

*Anesthesia.* The operation can be performed under local anesthesia if desired, but general anesthesia is to be preferred. When the latter is used the operator may proceed with the boldness that is so essential to success and which he could not safely assume were the patient under local anesthesia. This is not because of any inefficacy of local anesthesia, but because of the fact that the patient cannot help being conscious and apprehensive of the manipulation proceeding in the operative region. With the care of the patient's psychology off his mind, the surgeon can give his undivided attention to the technique of his operation. Unexpected pathology may be more conveniently dealt with the patient under general anesthesia. In not a few cases, however, local anesthesia is desirable or absolutely necessary. For instance, in the case of a cardiac or a nephritic patient, or one with a high blood-pressure, local anesthesia is much to be preferred even to a short, general anesthesia. For general anesthesia either gas oxygen, gas-ether, or straight ether may be employed although the latter is not pleasant to the patient. Novocaine, in a strength of  $\frac{1}{4}$  per cent or quinine urea hydrochloride in the strength of  $\frac{1}{5}$  per cent injected throughout the area of operation, will produce a local anesthesia of sufficient intensity and duration to allow the performance of the operation described in the following paragraphs. The solution is injected in each quadrant of the perianal region and subcutaneously up beneath the mucosa of the anal canal for  $\frac{3}{4}$  inch. It is well to determine the completeness of anesthesia produced before proceeding to the actual operation.

Sacral anesthesia gives good results in some hands, but unless skilfully given may produce a rather incomplete anesthesia which will require a supplement of local anesthesia. In the absence of familiarity with this method a simple local anesthesia is advisable.

*Position.* If general anesthesia be used the position employed is the dorsal one, but where local anesthesia is given more choice is possible. In operating on male cases I personally prefer the knee-elbow or knee-chest position. For

females the left lateral position is more comfortable and more satisfactory to the operator.



FIG. 34. Note difference in bulk of shank with same amount of cutting edge in action—note belly on author's scissors (A) with sharp external edge as compared with ordinary dissecting scissors (B).

*Instruments Needed.* Syringe 10 c.c. of the Leur or Record type with small gauge needles; bistoury, small blade; scissors, flat, blunt pointed (Fig. 34); scissors, curved-on-flat, blunt-pointed, and hemostats.

*Supplies Needed.* Gauze sponges, 2 by 2; gauze drains,  $\frac{1}{2}$  inch; sterile vaseline; fluff gauze, and a T-binder.

*Procedure.* With a sharp, small-bladed bistoury make the incisions outlined in Figure 37. Each should be  $\frac{3}{8}$  inch in length and should be carried down through the skin till the subcutaneous tissue is felt. With the flat scissors the lateral perianal region is then rapidly and completely



FIG. 35. NOTE: Observe how curve of author's scissors (A) conforms with that of the inter-natal depression. Note thinness and sharpness of blades as compared with ordinary dissecting scissors (B).

undercut through the lateral incisions. Then with the curved-on-the-flat scissors the anterior and posterior areas of the perianal region are undercut, and, by reversing the scissors and working through the medial incisions, the lining of the anal canal and the medial area of the perianal region are likewise undercut. The entire undercut area extends about  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches laterally from the border of the anus and for 1 inch up into the anal canal from the same point. During this operation the sphincter is to be avoided and may be

easily avoided if the author's specially designed thin-bladed scissors are used. The use of these scissors will also preclude accidental perforations of the area being undercut. These accidental perforations, known as "buttonholes," are not desirable and the use of the blunt-pointed scissors described lessens the danger of their production.

*Dressing.* Bleeding is controlled by compression and gauze drains are inserted in such a manner as to prevent,

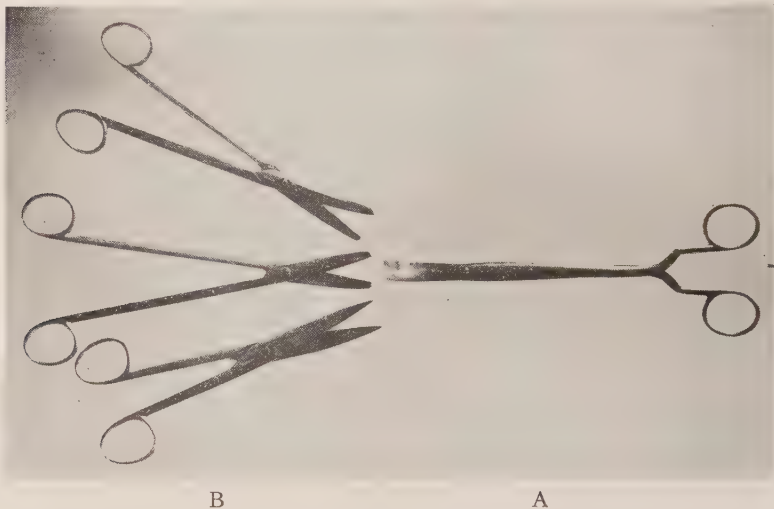


FIG. 36. NOTE: With same amount of cutting edge in action in all the scissors shown, note the small bulk of the shank of author's type (A) as compared with the ordinary dissecting scissors (B).

as far as possible, approximation of the newly cut surfaces. An abundant dressing of fluff gauze is put in place over the operative field and a T-bandage firmly applied.

*Postoperative Treatment.* The effect of this operation should be an immediate and complete loss of tactile sensation in the zone undercut. There should be no interference with defecation, though there may be a reflex suppression of urine for twelve to eighteen hours after the operation. This usually clears up spontaneously, but in case of doubt it is best to catheterize the patient twelve hours after operation. Although the patient need not be confined to bed longer than twenty-four hours, it is advisable to keep him from active

work at least for four or five days. His diet should be liquid the first day, and soft diet for the next three days. I prefer giving Tr. opii, 10 minims three times daily after meals for



FIG. 37. Author's operation. Lines of incision indicated.

the first three days. This keeps the bowels at rest and aids in the undisturbed readjustment of the tissues in the operative field. Should defecation become imperative a low oil enema is given previous to the defecation and the parts immediately

cleaned thereafter. Fresh dressings are applied to the wound daily, but the drains remain in situ till the third day, when they are removed. Twice daily thereafter the wound is irrigated through and through with a mixture of petrolatum and chloroform or ether.

#### INJECTION METHODS

From time to time various methods of injecting fluids under the skin of the affected area, thereby hoping to produce anesthesia if not a cure, have been introduced, extolled, discarded and all but forgotten.

The use of quinine and urea hydrochloride in this manner was suggested in 1916 by W. E. Ground of England. The rationale of this method is presumed by him to be as follows: A fibrosis of the tissue of the corium occurs and this decreases the blood supply of the papillae to such an extent that the end-organs contained therein are relieved of the ordinary hemic pressure. Thus irritation by such pressure ceases. What actually does happen is that a prolonged anesthesia of from three to five days occurs, during which time sloughing of the skin not infrequently takes place. Should this misfortune not occur, the skin gradually regains normal sensation and with it a most terrific exacerbation of the pruritus, owing to the sclerotic contraction of the fibrinous deposits caused by such injections. The mechanism of this must be clear to all when we see the fibrous connective-tissue extending up into the papillae where the sensory end-organs reside. (See Fig. 9, p. 30.) Knowing the inherent tendency of fibrous tissue to contract, we can readily understand the irritative pressure that is thus brought to bear upon the sensory end-organs by such a process.

Alcohol, in varying strengths, has been suggested by Stone of Johns Hopkins and hydrochloric acid by Hanes of Louisville. These and other injections are certainly heroic measures with danger of doing damage; of actually increasing the condition they seek to alleviate and at best giving but a very brief respite from the most tantalizing, nerve-racking disease with which mankind is afflicted.

## CHAPTER VIII

### THE CLINICAL IMPORTANCE OF ANAL PRURITUS

The clinical importance of anal pruritus consists in the recognition of the underlying principle that pruritus is the perception of noxious afferent impulses whose intensities are below that necessary to evoke the perception of pain.

Working upon the basis of this assumption we are led to the realization that pruritus like pain merits more than passing consideration and palliative treatment. It is the expression of an abnormal state of being and deserves as thorough an investigation as does its related symptom—pain. Medical opinion is unanimous in its disapproval of the drugging of a patient to quiet pain when such palliation is not accompanied by a vigorous effort to ascertain the cause or causes at work in its production. Such a procedure is unscientific and it is therefore rightfully condemned. Yet medical men in general seem quite indifferent as to the underlying cause of pruritus and are content to attempt its palliation by purely empirical means. It is to this discrepancy I wish to draw attention.

The weight of evidence favors the theory expressed in a previous chapter to the effect that in a hitherto unsuspected but nevertheless definite percentage of cases with pruritus of the perineum a transference of afferent impulses occurs in the posterior spinal ganglia and spinal cord which results in a mis-reference of pruritus in a manner precisely similar to the mis-reference of pain! The latter theory has now been widely if not universally accepted as true. Anal pruritus is just as truly a mis-referred sensation, and the fact that it indicates pathology elsewhere than in the area of apparent disturbance is its outstanding clinical importance. As a symptom, therefore, of visceral disease or derangement its value cannot be overestimated; hence, the author urges its recognition as such.

When viewed in this light we avail ourselves of a hitherto overlooked early manifestation of visceral disease. Because

of the delicacy of perception represented, pruritus occurs during the very early stages of visceral disease and thus precedes in many cases, actual pain. In slowly incipient or very chronic conditions pruritus may actually supplant pain as a symptomatic expression.

*The obvious value of localized pruritus, therefore, lies in the fact that it is an early symptomatic warning of visceral disease.* To those who recognize it as such its clinical importance is apparent. It calls for a complete physical examination with particular inspection of the pelvic and abdominal viscera. Such an examination will lead to the discovery of a pathological condition in its very early stages. Such a finding is of incalculable value as it makes treatment more certain of success and indeed makes successful treatment possible in some cases where a delay would deny it.

The foregoing is of particular significance when considered in relation with carcinoma either of the pelvic or abdominal organs. In this instance an early diagnosis is of utmost value and any aid to its establishment ought to be utilized. If every case of anal pruritus were subjected to a sigmoidoscopic examination, carcinoma of the rectum would be seen more often in a truly operable state rather than in the inoperable form in which it is now generally brought to the rectal surgeon's attention. I have seen many cases of early carcinoma with an associated anal pruritus, but the fully developed growth does not cause its production so often. The point I wish to stress is not that one can make an instant and complete diagnosis of carcinoma of the rectum or colon from the mere presence of anal pruritus, but rather that the presence of such a symptom broadly indicates visceral pathology. And a thorough search for this will reveal a carcinomatous condition should it be present.

Incidentally, by adopting the author's view of the significance of this condition, the patient will not be subjected to much well-intended but useless, if not actually harmful, local therapeutics while neglecting the discovery of the basic causes. Not only is it true that the permanent relief of anal pruritus can only come through the removal of the cause, but it is equally true that full justice cannot be done the patient if we palliate his natural symptom and leave untouched the source of his trouble—visceral pathology.

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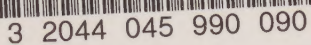
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